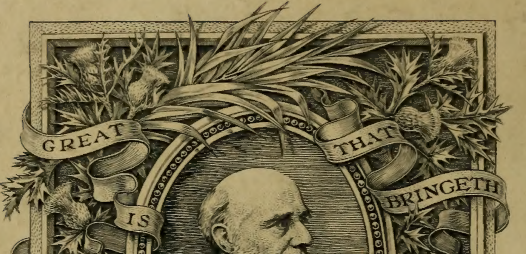
GREAT IS THE GIFT THAT BRINGETH KNOWLEDGE
NON EST MORTVVS QVI SCIENTIAM VIVIFICAVIT
Ptolemaeus
THE JOHN CRERAR LIBRARY ✠ CHICAGO.
1894
EDFrench sc. 1896

MaH1

THE M. A. C. BULLETIN

Vol. I. No. 2. For May, 1909.

Published Six Times a Year by the College.
Jan., Feb., Mar., May, Sept., Oct.

ENTERED AS SECOND-CLASS MAIL MATTER AT THE POST OFFICE, AMHERST, MASS.

Public Document No. 31

CATALOGUE

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE,

1908-1909.

FORTY-SIXTH ANNUAL REPORT.

PART II.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1909.

> Without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. — *Act of Congress, July 2, 1862.*

MASSACHUSETTS AGRICULTURAL COLLEGE,

AMHERST.

CATALOGUE, 1908-1909.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1909.

A 3 W

Approved by
The State Board of Publication.

Vacations and holidays are indicated by light-faced type.

1908

July

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

August

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

September

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

October

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

November

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

December

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

1909

January

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

February

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28						

March

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

April

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

May

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

June

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

July

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

August

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

September

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

October

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

November

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

December

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

1910

January

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

February

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28					

March

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

April

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

May

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

June

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

378.744
M&H1

THE MASSACHUSETTS AGRICULTURAL COLLEGE.

CALENDAR.

1909.

January 4, Monday, 1 P.M.,	Winter recess ends.
February 1, Monday,	Semester examinations begin.
February 8, Monday, 1 P.M.,	Second semester begins.
February 22, Monday,	Washington's birthday, holiday.
March 26, Friday, 6 P.M.,	Spring recess begins.
April 5, Monday, 1 P.M.,	Spring recess ends.
April 19, Monday,	Patriots' Day, holiday.
May [31, Monday],	Memorial Day, holiday.
June 7, Monday,	Senior examinations begin.
June 15, Tuesday,	Non-senior examinations begin.
June 19–23, Saturday–Wednesday,	Commencement exercises.
June 24–25, Thursday–Friday,	Entrance examinations.

SUMMER VACATION.

September 13–14, Monday–Tuesday,	Entrance examinations.
September 13–15, Monday–Wednesday,	Condition examinations.
September 15, Wednesday, 9.30 A.M.,	First semester begins; assembly.
November 24–29, Wednesday, 1 P.M.–Monday, 1 P.M.,	Thanksgiving recess.
December 17, Friday, 6 P.M.,	Winter recess begins.

1910.

January 3, Monday, 1 P.M.,	Winter recess ends; assembly.
January 31, Monday,	Semester examinations begin.
February 7, Monday, 1 P.M.,	Second semester begins; assembly.
February 22, Tuesday,	Washington's Birthday, holiday.
March 25, Friday, 6 P.M.,	Spring recess begins.
April 4, Monday, 1 P.M.,	Spring recess ends; assembly.
April 19, Tuesday,	Patriots' Day, holiday.
May 30, Monday,	Memorial Day, holiday.
June 6, Monday,	Senior examinations begin.
June 14, Tuesday,	Non-senior examinations begin.
June 18–22, Saturday–Wednesday,	Commencement exercises.
June 23–24, Thursday–Friday,	Entrance examinations.

MASSACHUSETTS AGRICULTURAL COLLEGE.

HISTORY. — The Massachusetts Agricultural College was among the colleges established under the national land grant act of 1862. This act gave public lands to the several States and Territories for the establishment of colleges for the benefit of agriculture and the mechanic arts; it was framed by the late Senator Justin Smith Morrill of Vermont. For our own college, liberal appropriations are also made by the Legislature of Massachusetts.

The college was incorporated in 1864, and on the 2d of October, 1867, was formally opened to an entering class of 33. In January, 1875, an arrangement was made with the authorities of Boston University under which the college, without losing its independence, became the school of agriculture of the university. Under this arrangement, graduates of the Massachusetts Agricultural College may, upon certain conditions, receive the diploma in science awarded to graduates of the university. In 1882 the State experiment station was located at the college. It has since been incorporated with the college.

COURSES. — The college offers a free education to any American student who may fulfill the requirements of admission. Women are admitted on the same standing as men. Foreign students pay a tuition fee. The four-years course leads to the degree of bachelor of science, and graduate courses are given leading to the degrees of master of science and of doctor of philosophy. Winter courses of ten weeks are offered, and, upon announcement, special courses. There is also a summer school of agriculture, designed chiefly for persons desiring to teach agriculture in the elementary and high schools.

PURPOSE OF THE COLLEGE. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement, the term "agricultural" is used in the broadest sense. Courses are offered which give efficiency in various practical pursuits, such as general farming, dairying, the management of estates, fruit growing, glass farming, landscape gardening, forestry and arboriculture. Students also qualify for positions in institutions designed for investigation in the many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, and for business occupations having connection with the farm and needing expert service.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences — particularly chemistry, physics, mathematics and engineering — are an essential preparation. Still other students find the course a splendid general education, without regard to future occupation. The course is well balanced; each student is required to study English, a modern foreign language, literature, political science and history.

Location and Equipment. — Situated in the beautiful town of Amherst, the college has an inspiring outlook. The campus is especially attractive. The grounds comprise more than 400 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst, 97 miles west of Boston, is on the Central Vermont Railroad and the Central Massachusetts division of the Boston & Maine Railroad. Electric car lines connect the village with Northampton, Holyoke, Springfield and other cities. The town library is open to students, in addition to the college library, as are also good courses of lectures and concerts in the village, supplementing the various interests of college life.

THE MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college. It was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about two-fifths of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to the committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, extension work and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

THE CORPORATION.

MEMBERS OF THE CORPORATION.

	TERM EXPIRES
Frank Gerrett of Greenfield,	1910
Samuel C. Damon of Lancaster,	1910
Thomas L. Creeley of Belmont,	1911
Charles H. Preston of Danvers,	1911
Carroll D. Wright[1] of Worcester,	1912
M. Fayette Dickinson of Boston,	1912
William H. Bowker of Boston,	1913
George H. Ellis of Boston,	1913
J. Howe Demond of Northampton,	1914
Elmer D. Howe of Marlborough,	1914
Nathaniel I. Bowditch of Framingham,	1915
William Wheeler of Concord,	1915
Arthur G. Pollard of Lowell,	1916
Charles A. Gleason of New Braintree,	1916

MEMBERS EX OFFICIO.

His Excellency Governor Eben S. Draper,
President of the Corporation.

Kenyon L. Butterfield, *President of the College.*
George H. Martin, *Secretary of the Board of Education.*
J. Lewis Ellsworth, *Secretary of the Board of Agriculture.*

OFFICERS OF THE CORPORATION.

His Excellency Governor Eben S. Draper of Boston,
President.

Charles A. Gleason of New Braintree, *Vice-President.*
J. Lewis Ellsworth of Worcester, *Secretary.*
Fred C. Kenney of Amherst, *Treasurer.*
Charles A. Gleason of New Braintree, *Auditor.*

---

[1] Died Feb. 20, 1909; succeeded by Davis R. Dewey of Cambridge.

Standing Committees of the Corporation.[1]

Committee on Finance.

Charles A. Gleason, *Chairman.*
George H. Ellis.
Arthur G. Pollard.
J. Howe Demond.
Charles H. Preston.

Committee on Course of Study and Faculty.

William Wheeler, *Chairman.*
William H. Bowker.
M. Fayette Dickinson.
George H. Martin.
Elmer D. Howe.
Carroll D. Wright.[2]

Committee on Farm and Horticulture.

Farm Division.

George H. Ellis, *Chairman.*
Frank Gerrett.
Charles A. Gleason.
Nathaniel I. Bowditch.

Horticulture Division.

J. Lewis Ellsworth, *Chairman.*
Thomas L. Creeley.
Elmer D. Howe.

Committee on Experiment Department.

Charles H. Preston, *Chairman.*
J. Lewis Ellsworth.
William H. Bowker.
Arthur G. Pollard.
Samuel C. Damon.

Committee on Buildings and Arrangement of Grounds.

M. Fayette Dickinson, *Chairman.*
William Wheeler.
Frank Gerrett.
William H. Bowker.
Nathaniel I. Bowditch.

Examining Committee of Overseers.

John Bursley of West Barnstable, *Chairman.*
Warren C. Jewett of Worcester.
Isaac Damon of Wayland.
Frank Gerrett of Greenfield.
Noble B. Turner of Great Barrington.

---

[1] The president of the college is ex-officio member and secretary of standing committees. The director of the experiment station is a member of the committee on experiment department, without vote.

[2] Died Feb. 20, 1909; succeeded by Davis R. Dewey of Cambridge.

OFFICERS OF THE INSTITUTION.

THE FACULTY.

[The names of the faculty are arranged in groups according to rank. Within these groups, the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held.]

KENYON L. BUTTERFIELD, A.M., President of the College and Professor of Rural Sociology, 25 Sunset Avenue.

GEORGE F. MILLS, M.A., Dean of the College, Head of the Division of the Humanities and Professor of Languages and Literature, 46 Amity Street.

CHARLES H. FERNALD, Ph.D., Director of the Graduate School and Professor of Zoölogy, 3 Hallock Street.

WILLIAM P. BROOKS, Ph.D., Director of the Experiment Station and Lecturer on Soil Fertility, Massachusetts Agricultural College.

FRANK A. WAUGH, M.Sc., Head of the Division of Horticulture and Professor of Landscape Gardening, Massachusetts Agricultural College.

JAMES A. FOORD, M.Sc., Acting Head of the Division of Agriculture and Professor of Farm Administration, Nutting Avenue.

CHARLES A. GOESSMANN, Ph.D., LL.D., Honorary Professor of Chemistry and Honorary Director of the Experiment Station, 40 Pleasant Street.

CHARLES WELLINGTON, Ph.D., Professor of General and Agricultural Chemistry, 34 Amity Street.

JAMES B. PAIGE, B.Sc., D.V.S., Professor of Veterinary Science, 42 Lincoln Avenue.

GEORGE E. STONE, Ph.D., Professor of Botany, Mt. Pleasant.

JOHN E. OSTRANDER, A.M., C.E., Professor of Mathematics and Civil Engineering, 33 North Prospect Street.

HENRY T. FERNALD, Ph.D., Professor of Entomology, 44 Amity Street.

GEORGE C. MARTIN, C.E., Captain 18th United States Infantry, Professor of Military Science and Tactics, Amherst House.

WILLIAM R. HART, A.M., Professor of Agricultural Education, 97 Pleasant Street.

FRED C. SEARS, M.Sc., Professor of Pomology, Mt. Pleasant.

PHILIP B. HASBROUCK, B.Sc., Associate Professor of Mathematics, Adjunct Professor of Physics and Registrar of the College, 130 Pleasant Street.

FRED C. KENNEY, Treasurer, Mt. Pleasant.

S. FRANCIS HOWARD, M.Sc., Assistant Professor of Chemistry, 10 Allen Street.

A. VINCENT OSMUN, M.Sc., Assistant Professor of Botany, North Amherst.

GEORGE N. HOLCOMB, A.B., S.T.B., Assistant Professor of Political Science, North Amherst.

Clarence E. Gordon, B.Sc., A.M., Assistant Professor of Zoölogy and Curator of the Zoölogical Museum, North Amherst.

Robert Wilson Neal, A.M., A.M., A.M., Assistant Professor of English, 7 Woodside Avenue.

Edward A. White, B.Sc., Assistant Professor of Floriculture, 55 Pleasant Street.

Percy L. Reynolds, M.D., Assistant Professor of Physical Education and Hygiene, North Amherst.

William P. B. Lockwood, B.S.Agr., Assistant Professor of Dairying, 5 East Pleasant Street.

Robert W. Lyman, B.Sc., LL.B., Lecturer on Farm Law, Northampton.

Frank W. Rane, M.Sc., Lecturer on Forestry, State House, Boston.

Robert D. MacLaurin, Ph.D., Lecturer on Organic Chemistry, 6 Kellogg Avenue.

Sidney B. Haskell, B.Sc., Instructor in Agronomy, 12 Cottage Street.

Harold F. Tompson, B.Sc., Instructor in Market Gardening, Massachusetts Agricultural College.

Ray L. Gribben, B.S.A., Instructor in Animal Husbandry, 66 Pleasant Street.

Floyd B. Jenks, B.S.Agr., Instructor in Agricultural Education, 97 Pleasant Street.

Edgar L. Ashley, A.M., Instructor in German, 12 Lincoln Avenue.

Anderson A. Mackimmie, A.B., Instructor in French and Spanish, North Amherst.

C. Robert Duncan, B.Sc., Instructor in Mathematics and Physics, 46 Pleasant Street.

Charles R. Green, B.Agr., Librarian, Mt. Pleasant.

Alexander E. Cance, Ph.D., Instructor in Agricultural Economics, 9 Fearing Street.

Frank M. Gracey, Assistant in Landscape Gardening, 56 Pleasant Street.

Ernest C. Fowler, B.S., Assistant in Chemistry, 15 Amity Street.

Harry M. Jennison, B.Sc., Assistant in Botany, 66 Pleasant Street.

Leon I. Shaw, M.Sc., Assistant in Chemistry, 66 Pleasant Street.

Other College Officers.

Edwin H. Forristall, M.Sc., Farm Superintendent, Massachusetts Agricultural College.

Ralph J. Watts, B.Sc., Secretary to the President, 116 Pleasant Street.

Newton Wallace, Electrician, 6 Phillips Street.

Clarence A. Jewett, Superintendent of Buildings, 16 Whitney Street.

Miss Clara L. Stuart, Correspondence Clerk, Draper Hall.

Miss Mary E. Caldwell, Bookkeeper, Treasurer's Office, Draper Hall.

Miss Henrietta Webster, Clerk, Treasurer's Office, 79 Pleasant Street.

Miss Edith C. Hubley, Stenographer, Division of Horticulture, Draper Hall.

Miss Gertrude Warner, Stenographer, Division of Agriculture, Draper Hall.

ADDITIONAL INSTRUCTORS FOR THE SUMMER SCHOOL, 1908.

Dr. W. D. HURD, Professor in the University of Maine: Field Crops and Agricultural Industry.

Dr. T. N. CARVER, Professor in Harvard University: Agricultural Economics.

A. C. MONAHAN, Principal of the Turners Falls High School: High School Chemistry.

Prof. W. H. DUDLEY, of the Wisconsin Normal School: Bird Life.

ADDITIONAL INSTRUCTORS FOR THE WINTER COURSE, 1909.

NATHAN J. HUNTING, B.Sc., Instructor in the Use of Separators.
SAMUEL COONS, Instructor in Butter Making.
JOHN N. SUMMERS, B.Sc., Instructor in Entomology.
NEWTON WALLACE, Instructor in Dairy Mechanics.

GRADUATE ASSISTANTS.

JOHN N. SUMMERS, B.Sc., Assistant in Entomology.

OFFICERS OF THE EXPERIMENT STATION.

CHARLES A. GOESSMANN, Ph.D., LL.D., Honorary Director and Expert Consulting Chemist, 40 Pleasant Street.

WILLIAM P. BROOKS, Ph.D., Director, Massachusetts Agricultural College.

FRED C. KENNEY, Treasurer, Mt. Pleasant.

CHARLES R. GREEN, B.Agr., Librarian, Mt. Pleasant.

DEPARTMENT OF PLANT AND ANIMAL CHEMISTRY.

JOSEPH B. LINDSEY, Ph.D., Chemist, 47 Lincoln Avenue.

EDWARD B. HOLLAND, M.Sc., Associate Chemist, in Charge of Research Division, 28 North Prospect Street.

HENRI D. HASKINS, B.Sc., In Charge of Fertilizer Division, 87 Pleasant Street.

ROBERT D. MACLAURIN, Ph.D., First Assistant in Research Division, 6 Kellogg Street.

PHILIP H. SMITH, B.Sc., In Charge of Feed and Dairy Division, 102 Main Street.

ROY F. GASKILL, Assistant in Animal Nutrition, Massachusetts Agricultural College.

LEWELL S. WALKER, B.Sc., Assistant, 19 Phillips Street.

PHILIP V. GOLDSMITH, B.Sc., Assistant, 32 North Prospect Street.

JAMES C. REED, B.Sc., Assistant, 19 Phillips Street.

JAMES P. HOWARD, Inspector.

DEPARTMENT OF AGRICULTURE.

WILLIAM P. BROOKS, Ph.D., Agriculturist, Massachusetts Agricultural College.

ERWIN S. FULTON, B.Sc., First Assistant Agriculturist, North Amherst.

EDWIN F. GASKILL, B.Sc., Second Assistant Agriculturist, Mr. Goldberg's.

DEPARTMENT OF HORTICULTURE.

FRANK A. WAUGH, M.Sc., Horticulturist, Massachusetts Agricultural College.

FRED C. SEARS, M.Sc., Pomologist, Mt. Pleasant.

JACOB K. SHAW, M.Sc., Assistant Horticulturist, Amherst House Annex.

DEPARTMENT OF BOTANY AND VEGETABLE PATHOLOGY.

GEORGE E. STONE, Ph.D., Botanist and Vegetable Pathologist, Mt. Pleasant.

GEORGE H. CHAPMAN, B.Sc., Assistant Botanist, Fearing Street.

Department of Entomology.

Charles H. Fernald, Ph.D., Entomologist, 3 Hallock Street.
Henry T. Fernald, Ph.D., Associate Entomologist, 44 Amity Street.
John N. Summers, B.Sc., Assistant Entomologist, 66 Pleasant Street.

Department of Veterinary Science.

James B. Paige, B.Sc., D.V.S., Veterinarian, 42 Lincoln Avenue.

Department of Meteorology.

John E. Ostrander, A.M., C.E., Meteorologist, 33 North Prospect Street.
Rockwood C. Lindblad, Observer, Massachusetts Agricultural College.

Other Officers of the Experiment Station.

Miss Rose J. Brown, Secretary to the Director, Draper Hall.
Miss Jessie V. Crocker, Stenographer, Department of Botany and Vegetable Pathology, Sunderland.
Miss Harriet Cobb, Stenographer, Department of Plant and Animal Chemistry, 33 Cottage Street.
Miss Bridie O'Donnell, Stenographer, Department of Entomology, Amherst.

COMMITTEES OF THE FACULTY.

INSTRUCTION.[1]

Professor MILLS, *Chairman.*
  Professor WELLINGTON.
  Professor OSTRANDER.
  Professor WAUGH.
  Professor HART.
  Professor FOORD.

ENTRANCE EXAMINATIONS AND ADMISSION.[1]

The REGISTRAR, *Chairman.*
  Assistant Professor HOWARD.
  Assistant Professor GORDON.
  Assistant Professor NEAL.
  Assistant Professor HOLCOMB.

GRADUATE SCHOOL.[1]

Professor C. H. FERNALD, *Chairman.*
  Professor WELLINGTON.
  Professor STONE.
  Professor H. T. FERNALD.
  Professor WAUGH.
  Professor MILLS.

STUDENT ACTIVITIES.[1]

The DEAN, *Chairman.*
  Professor STONE.
  Captain MARTIN.
  Professor SEARS.
  Mr. GRIBBEN.

ATHLETICS.[1]

Professor PAIGE, *Chairman.*
  Assistant Professor REYNOLDS.
  Assistant Professor GORDON.

---

[1] The president is ex officio a member.

CATALOGUE AND OTHER PUBLICATIONS.[1]

Assistant Professor NEAL, *Chairman.*
Assistant Professor OSMUN.
Professor OSTRANDER.

LIBRARY.[1]

Professor Stone, CHAIRMAN.
Professor BROOKS.
Professor H. T. FERNALD.
The TREASURER.

SCHEDULE.[1]

Professor OSTRANDER, *Chairman.*
Professor PAIGE.

ADVISORY COMMITTEE ON STUDENT LABOR.

The TREASURER, *Chairman.*
The DEAN.
The REGISTRAR.

ADVISORY COMMITTEE ON DISCIPLINE.

The DEAN, *Chairman.*
The REGISTRAR.
The TREASURER.
The COMMANDANT.

---

[1] The president is ex officio a member.

THE COLLEGE.

ADMISSION.

A. APPLICATION FOR ADMISSION.

Correspondence about admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. If an applicant desires a free State scholarship, he must also present to the registrar a certificate of appointment from the State senator of his district. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. MODES OF ADMISSION.

Students are admitted to the freshman class either upon *certificate* or upon *examination*. No *diploma* from a secondary school will be considered.

CERTIFICATES. — The entrance requirements may be satisfied by certification in any of the following ways: —

1. By presenting certificate from a school approved for such privilege by this college.

2. By presenting certificate from any school approved by the college entrance examination boards.

3. By presenting the customary credentials from the Board of Regents of the State of New York for any of the subjects of the entrance requirements.

Certificates must present at least three of the six required subjects for admission, and not less than seven of the necessary fourteen credits in all. Those subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. A candidate deficient in both algebra and plane geometry will not be admitted. For the fall of 1909 conditions to the amount of three and one-half units will be allowed; for the fall of 1910 conditions to the amount of two and one-half units; for the fall of 1911 and the following years conditions to the amount of two units will be allowed.

Places of Examination. — Examinations for admission to the college are held as follows: —

In June of each year: in Amherst, in the building of the Department of Mathematics, Massachusetts Agricultural College; in Boston, in the College of Liberal Arts of Boston University, Boylston Street, corner of Exeter; in Worcester, in Horticultural Hall; in Pittsfield, in the City Hall.

In September of each year: in Amherst only, in the building of the Department of Mathematics, Massachusetts Agricultural College.

Time Schedule for Examinations, 1909. — The examinations for entrance in 1909 will be held on the following dates: —

In June, on Thursday, June 24, and Friday, June 25.

In September, on Monday, September 13, and Tuesday, September 14.

The schedule for examination in both June and September will be as follows: —

First Day.

8.30 A.M.	Registration.
9.00 A.M.	Chemistry, solid geometry.
11.00 A.M.	United States history and civics.
2.00 P.M.	Plane geometry.
4.00 P.M.	History, elective.

Second Day.

8.30 A.M.	Algebra.
10.30 A.M.	Physiology, chemistry.
2.00 P.M.	English.
4.30 P.M.	French or German.

C. Requirements for Admission.

In June and September, 1909, candidates for admission upon certificate may offer themselves under the requirements announced in the catalogue of 1907-08 (see Addenda, "Examinations in 1909"), or under those here stated; but candidates for admission upon examination will not be examined except according to the announcements of the earlier catalogue.

The following requirements will therefore be in force in 1909 for certification only, but thereafter for both certification and examination.

The requirements for admission are based on the completion of a four-years course in a high school or its equivalent, and are stated in terms of units. The term unit means the equivalent of five recitations a week for a school year. Fourteen units must be offered for admission, of which nine are required and five are elective.

(*a*) The following nine units are required: —

Language.

English,	3
French or German,	2

History and Civics.

United States history and civics,	½
History (elective),	1
(*a*) Ancient history.	
(*b*) Medieval and modern history.	
(*c*) English history.	
(*d*) General history.	

Mathematics.

Algebra, through progressions,	1½
Plane geometry,	1

(*b*) In addition to the requirements under (*a*), five units must be offered from the following-named elective subjects. Not more than four of those subjects in which the credit sought is one-half unit will be accepted.

Language.

English in addition to requirements,	1
French in addition to requirements,	2 or 1[1]
German in addition to requirements,	2 or 1[1]
Greek,	2 or 3
Latin,	2 or 3

History.

In addition to requirements,	1 or 2

Mathematics, and Other Sciences.

Solid geometry,	½
Trigonometry,	½
Chemistry,	1
Physiography,	½
Physiology,	½

---

[1] If but one elective unit be offered, it must be in the same language as that offered to meet the two-year language requirement.

Agriculture,[1]	½ or 1
Botany,[1]	½ or 1
Geology,[1]	½
Physics,[1]	1
Zoölogy,[1]	½
Commercial geography,[2]	½
Drawing,[2]	½
Manual training,[2]	½ or 1

PRESENTATION OF NOTE-BOOKS.—In specified subjects, the keeping of note-books is required as part of the preparation. If an applicant present a certificate in any one of these subjects, the certificate must state that the note-book has been satisfactorily prepared, but the note-book itself is not to be submitted; but if the applicant takes an examination, he must submit the note-book itself, at the same time as and as part of the examination; and note-books so presented must themselves be certified by the principal.

D. STATEMENT[3] OF PREPARATION REQUIRED FOR ADMISSION.

AGRICULTURE. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade.

BOTANY. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board (address sub-station 84, New York City), or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half unit or the one unit credit; and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

---

[1] Note-books required as part of preparation in these subjects; must be presented, properly certified, at examination; must be certified to but not presented in case of admission on certificate.

[2] Certification necessary in these subjects; no examinations given.

[3] In alphabetical order by subjects.

CHEMISTRY. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements, some of the experiments being quantitative. The keeping of a note-book is required.

COMMERCIAL GEOGRAPHY. — Preparation should be given in a course equivalent to that laid down in Adams's "Commercial Geography," Trotter's "Geography of Commerce," or a similar work.

DRAWING. — Applicants may offer either freehand or mechanical drawing, or both. They must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable them to draw correctly a simple geometric model from memory; or, if they present mechanical drawing, they must have considerable working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented see Manual Training.

ENGLISH. — In English, preparation for entrance to the college will best be made according to the recommendations of the Conference on Uniform Entrance Requirements in English, as embodied in the requirements stated by the College Entrance Examination Board (address sub-station 84, New York City).[1] Ability to think clearly, and to spell, punctuate and paragraph creditably, is indispensable. For the rhetorical study, a simple text is sufficient; but much practice in composition should be given.[2] Direct questions may be put, and tests in grammar will be included. Preparation should extend to both lists of books; and, in addition to this preparation, each candidate should be able to paraphrase or interpret with some insight unfamiliar verse or prose of medium difficulty; such a test of his ability to understand language independently will be included in the examination.

The following list of books, made up from the list recommended by the Conference on Uniform Entrance Requirements in English, enumerates the works recommended by the Conference of New England Colleges. The examination will be based upon these; but an applicant who has prepared upon other books of the longer list will be examined thereon if he notify the Department of English of his wish before the first day of February preceding the examinations.

---

[1] As a member of the Conference of New England Colleges on Entrance Examinations in English, this college will adapt itself to the policy of that conference.

[2] Upon request, the Department of English will send a leaflet containing fuller explanations and suggestions, recommendations about the fourth (elective) credit, and a definition of the term "credit unit" as it concerns English.

(*a*) For reading and composition practice — Shakspere's "Merchant of Venice" and "Julius Cæsar;" the "Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography;" Scott's "Ivanhoe;" Hawthorne's "House of the Seven Gables;" Dickens's "A Tale of Two Cities;" Scott's "The Lady of the Lake;" Macaulay's "Lays of Ancient Rome;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur."

(*b*) For detailed study and practice — Shakspere's "Macbeth;" Milton's "Lycidas," "Comus," "L'Allegro" and "Il Penseroso;" Burke's "Speech on Conciliation with America," or Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" Macaulay's "Life of Johnson" or Carlyle's "Essay on Burns."

FRENCH. — The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board (sub-station 84, New York City).[1]

Third and fourth year French (elective subjects for admission). — For a single credit unit in French as an elective subject for entrance, the work described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

GEOLOGY. — Grouped with zoölogy, which see.

GERMAN. — The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-years requirements).[1]

Third and fourth year German (elective subjects for admission). — For a single credit unit in German as an elective subject for entrance, the work described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

---

[1] A leaflet giving fuller information may be had by applying to the Department of Modern European Languages.

GREEK. — Greek will receive credit as an elective requirement upon either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first two books of Xenophon's "Anabasis;" and (*b*) the translation of passages of Attic prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency is shown in (*a*) the translation of a passage or passages selected from the first book of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the forms and constructions of the passages.

HISTORY. — Of the one and one-half required units the one-half unit must be offered in United States history and civics, and the one required unit must be offered in either ancient history, medieval and modern history, English history or general history. Either one or two elective units in any one of the historical subjects here named may be offered, provided that such units may not be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board (sub-station 84, New York City). The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on an outline map.

LATIN. — Latin will receive credit as an elective requirement by either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," books I. to IV., or an equivalent, and from Cicero's "Orations against Catiline;" and (*b*) the translation of passages of Latin prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency is shown in (*a*) the translation of a passage or passages selected from books I. and II. of Virgil's "Æneid;" and (*b*) translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," books I. to IV.

MANUAL TRAINING. — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

MATHEMATICS. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents; the formulas for the *n*th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work should consist of both class-room work and laboratory practice. The work covered in the class room should be equal to that outlined in Hall & Bergen's "Text-book of Physics;" the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOGRAPHY and PHYSIOLOGY. — Grouped with Zoölogy, which see.

ZOÖLOGY, PHYSIOGRAPHY, GEOLOGY, PHYSIOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis's "Elementary Physical Geography," Gilbert & Brigham's "Introduction to Physical Geography." For physiology, Hough & Sedgwick's "The Human Mechanism," Martin's "The Human Body; Briefer Course." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy."

Applicants for examination in zoölogy and geology are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present a note-book, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, and some option will be given the student among questions, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

E. ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. OTHER INFORMATION ABOUT ENTRANCE.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)
2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.
3. Candidates must in 1909 receive credit for at least ten and one-half units; in 1910, for eleven and one-half units; and thereafter for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. No candidate deficient in both algebra and plane geometry will be admitted.
4. Opportunities for removing entrance conditions are given six weeks after the opening of the college year. If a student fail at that time to clear his record of conditions, he may be given a second opportunity two weeks before the close of the first semester of the freshman year.
5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.
6. Preliminary examinations in part of the subjects required for entrance may be taken one year before entering college.
7. Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

(*a*) No entrance examination is required, but applicants must bring certificates showing that they have finished a four-years high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

(*b*) No applicant under twenty-one years of age will be admitted as an unclassified student.

(*c*) Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

(*d*) In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

(*e*) Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

(*f*) All unclassified students are subject to the supervision of a special committee.

(*g*) Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

(*h*) Unclassified students are subject to the regulations applying to classified students.

8. For information concerning expenses, scholarships, etc., see "General Information."

9. For information concerning admission to short courses see "Short Courses."

COURSES OF INSTRUCTION.

A. TABLE OF UNDERGRADUATE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

FRESHMAN YEAR.

First Semester.

[All work required.]

English and public speaking, (With declamation, 5; without it, 4.)	5 or 4
French or German,[1]	4
Algebra,	5
Chemistry,	3
Hygiene,	1
Physical education,[2]	2
College life (attendance required without credit).	
	20 or 19

Second Semester.

[All work required.]

English and public speaking, (With declamation, 5; without it, 4.)	5 or 4
French or German,	4
Geometry and trigonometry,	5
Chemistry,	3
Elementary agriculture,	2
Physical education,	2
	21 or 20

---

[1] Students may continue in college the language that they present for admission, or they may take the other; but they must continue whichever language they so elect until the end of the first semester of the sophomore year. Eleven college credits are required in this language.

[2] Physical education includes military training.

SOPHOMORE YEAR.

First Semester.

[All work required.]

English (proficient students may omit one hour),	2 or 1
French or German,	3
Agronomy,	3
Zoölogy,	3
Physics,	5
Physical education,	2
	18 or 17

Second Semester.

[All courses under "Required," with any two of those under "Elective."]

[Required.]

English (proficient students may omit one hour),	2 or 1
Elementary horticulture,	2
Botany,	4
Agricultural industry,	3
Physical education,	2
	13 or 12

[Elective.]

French or German, Animal husbandry, Geology, Physics, Chemistry, Surveying,	each 3 hours. Any two,	6
		19 or 18

JUNIOR AND SENIOR YEARS.

In the junior and in the senior year, work must be taken amounting to not fewer than seventeen nor more than twenty credits.

[Required.]

The following-named subjects are required after the sophomore year, as indicated: —

Physical education, two credits each semester of junior year,	4
Political science (Course 1, Economics),	3
English (any of the elective courses except Literature 15 and 16),	3

[Elective.]

Unless otherwise stated, elective courses are open to both juniors and seniors. Elections are subject to such provisions as the faculty may declare.

[Only those courses are here mentioned which are entirely elective; some courses that are open to election by part of the students but are required courses for others are omitted. For such courses, see under the respective department headings the descriptions of "Required Courses."]

- Agricultural education, 1, 2, 3, 5, 6.
- Agriculture: —
    - Agriculture, 2.
    - Agronomy, 1, 3, 4, 5, 6.
    - Animal husbandry, 2, 3, 4, 5, 6.
    - Dairying, 1, 2, 3, 4.
    - Farm administration, 3, 4.
- Botany, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14.
- Chemistry, 4, 5, 6, 7, 9, 10, 11, 12, 14, 16.
- Entomology, 2, 3, 4.
- Horticulture: —
    - Horticulture, 3, 4, 5, A.
    - Pomology, 1, 2, 3, 4.
    - Floriculture, 1, 2, 3, 4.
    - Landscape gardening, 1, 2, 3, 4, 5, 6.
    - Market gardening, 2, 3.
    - Drawing, 1, 2.
- Humanities: —
    - English language, 7, 9, 10, 11, 13, 14, (15, 16).
    - Literature, 7, 8, 9, 10, 11, 12, 14, 15, 16, 18.
    - Public speaking, 3, 4.
    - French, 6, 7, 8.
    - Spanish, 1, 2.
    - German, 6, 7, 8.
    - Music, 1.
    - Political science, 2, 4, 5, 7.
- Mathematics, 7, 10; Physics, 6, 9, 15; Engineering, 8, 11, 12, 13, 14.
- Military science, 7, 8.
- Physical education, 7, 8, 9, 10.
- Rural sociology: (agricultural economics) 4, 5, 7, 9, 10; (rural sociology) 12; (rural law) 14.
- Veterinary science, 1, 3, 4.
- Zoölogy and geology: —
    - Zoölogy, 1, 3, 4, (5, 6, 7).
    - Geology, 2.

B. UNDERGRADUATE COURSES.

[All courses given in the first semester bear odd numbers; all given in the second semester bear even numbers. Studies are pursued in courses, "course" implying the study given a subject within one semester, without regard to the total number of hours or to the number of credits. Under the heading "Required Courses" are classified all courses that are specifically required of any group of students, although in some cases the same courses are open to other students as electives. The special mention of certain courses as prerequisite to other courses does not imply that no courses but those so mentioned are "preliminary or preparatory" within the meaning of paragraph 9, page 9 of the Rules. Announcements of courses that are not given in 1909–10 are inclosed in brackets.]

Department of Agricultural Education.

Professor HART and Mr. JENKS.

Elective Courses.

1. MEANING OF EDUCATION (PSYCHOLOGY). — A study of the development, structure and function of the nervous system with reference to the sense organs; relation of mind to the nervous system; growth and nature of mental processes; the activities of the mind in the process of learning. Text-book, lectures, discussion, and collateral readings and reports; 3 hours. Credit, 3.
Professor HART.

2. VOCATIONAL EDUCATION (HISTORY AND PHILOSOPHY). — A survey of educational, religious and social movements with reference to their vocational aspects; the growth of educational institutions as influenced by science and industry. Lectures, collateral readings, reports, and a thesis on some phase of industrial education; 3 hours. Credit, 3. Professor HART.

3. METHODS. — A study of the subject-matter of agriculture that is appropriate for public schools; the relation of nature work to elementary agriculture; the school garden as a laboratory in connection with the science of biology; the relation of agricultural science to the other sciences. Prerequisite, Course 1 or 2; 2 hours. Credit, 2. Professor HART.

5. SEMINAR IN EDUCATION. — For students who have had courses 1, 2 and 3, or an equivalent. Topics that may be taken up for rather exhaustive study are: legislation and agricultural education, the place and value of agricultural science in school courses, etc. Seniors; open, subject to approval of the instructor, to other students; 2 hours. Credit, 2. Professor HART.

6. SEMINAR IN EDUCATION. — As stated under Course 5.
Professor HART.

DIVISION OF AGRICULTURE.

Professor FOORD, Dr. BROOKS, Assistant Professor LOCKWOOD, Mr. HASKELL, Mr. GRIBBEN.

SECTIONS.

Agronomy.
Animal Husbandry.
Dairying.
Farm Administration.

[With the exception of the course in elementary agriculture, required in the second semester of the freshman year, the work in agriculture is distributed among four sections: Agronomy, Animal Husbandry, Dairying and Farm Administration.]

Agriculture.

Required Courses.

2. ELEMENTARY AGRICULTURE. — A brief course touching upon the application of science to the common things of the farm. The work of the agricultural experiment stations and its relation to farm practice will be considered. Lectures, text-book and laboratory. Freshmen; 1 laboratory and 1 lecture period. Credit, 2.

Agronomy.

Required Courses.

1. SOILS AND FERTILIZERS. — A study of the formation, classification and physical and chemical properties of soils. This is followed by study of methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments. In the laboratory, a study of the physical properties of soils is made, followed by laboratory and field exercises on the preparation and use of fertilizers. Prerequisite, Chemistry 1 and 2. Sophomores; 2 lectures and 1 laboratory period. Credit, 3. Mr. HASKELL.

Elective Courses.

3. FIELD AND FORAGE CROPS. — History, classification, cultivation and harvesting, commercial grading and valuation. The crops studied are the cereal grains, grasses, legumes, forage crops, and those "money crops" of importance in New England. The laboratory work includes the testing of the purity and vitality of the seeds of the different field crops, valuation and judging thereof, and

study of the varieties suited to New England conditions. Prerequisites, Agronomy 1 and Botany 2; 2 lectures and 1 laboratory period. Credit, 3. Mr. HASKELL.

4. FIELD CROP IMPROVEMENT. — A study of the influences determining the yield and value of field crops, and of methods of selecting seed and plant with reference to crop improvement. Particular attention is given to the breeding of plants for early maturity, hardiness and disease resistance, so as to fit them to New England conditions. Lectures, laboratory and field work. Prerequisite, Agronomy 3; 1 lecture and 1 laboratory period. Credit, 2. Mr. HASKELL.

6. ADVANCED SOILS. — Theoretical and practical work on irrigation and drainage; soil survey, with the view of observing the relation between types of soil and its natural vegetation; soil mapping. Lectures, laboratory and library work; 2 lectures and 1 laboratory period. Credit, 3. Mr. HASKELL.

8. MANURES AND FERTILIZERS. — An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Each of the important manures and fertilizers will be discussed, its origin and its chemical and physical characteristics being considered. Each material taken up will be studied in relation to its capacity to supply plant food and to its effects upon soil texture, moisture, temperature and flora. Considerable attention will be devoted to consideration of the experimental work which has been done, and which is now in progress, in manures and fertilizers. Prerequisite, Agronomy 1; 3 lectures a week, with occasional seminars. Credit, 3. Dr. BROOKS.

Animal Husbandry.

Elective Courses.

2. TYPES AND BREEDS OF FARM ANIMALS. — A general introductory course. The development, characteristics and adaptability of the more common breeds of farm live stock. Lectures; Plumb's "Types and Breeds of Farm Animals." Sophomores; 2 lecture periods and 1 laboratory period. Credit, 3. Mr. GRIBBEN.

3. PRINCIPLES OF LIVE-STOCK IMPROVEMENT. — A careful study of the principles of inheritance, and a discussion of methods of im-

proving herds or individual animals, of crossing and grading in the production of market and farm stock. Prerequisite, Course 2; 3 lecture periods; library references. Credit, 3. Mr. Gribben.

4. Dairy Cattle. — Score cards as applied to breed type and their use in scoring for advanced registry; herd book study. One object is to acquaint the student with the various families of the different breeds, their producing powers and external characteristics. The men who will represent the college in judging contests will be chosen from those electing this course, according to the merit of their work. Text-book, lectures and laboratory work; text-book, Craig's "Live Stock Judging." Prerequisite, Course 2; 2 laboratory periods. Credit, 2. Mr. Gribben.

5. Horses, Sheep and Swine. — A course similar to Course 4, but dealing with different classes of stock. Of necessity, the study cannot be so detailed as that made in the preceding course, yet a good working knowledge of the judging of these classes is aimed at. The course will consist largely of judging practice, with some periods devoted to lectures, covering such topics as unsoundness in horses and the determination of age in domestic animals. Text-book, lectures and laboratory work. Craig's "Live Stock Judging." Prerequisite, Course 2; 2 laboratory periods. Credit, 2.
Mr. Gribben.

6. Feeding and Management of Farm Live Stock. — The principles of nutrition; their relation to stock feeding; the balanced ration; feeding standards; feed stuffs, method of manufacture, economy to the feeder; economical feeding and management of farm animals; feeding for special purposes (as of dairy cows for records and in preparation for public sales or exhibitions). Text-books and lectures; text-books, Henry's "Feeds and Feeding" and Jordan's "Feeding Farm Animals;" experiment station bulletins. Students electing this course are advised to present Chemistry 5 and 6 and register in veterinary science; 3 hours. Credit, 3.
Mr. Gribben.

Dairying.

Elective Courses.

1. Milk and its Composition. — The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; methods in economic milk production; methods for testing herds and

developing them to higher efficiency; the study of analysis of milk products by use of the Babcock test for fat, tests for acidity and adulteration, and ordinary preservatives; moisture tests for butter; problems. Must be preceded or accompanied by Animal Husbandry 3; 2 lecture hours and 1 laboratory period. Credit, 3.
Assistant Professor LOCKWOOD.

2. MARKET MILK. — A study of the market milk conditions, extent and development of the business, supply and delivery; food value of milk and its use as food; milk and its relation to the public health; methods for the proper handling and preparing of milk and cream for direct consumption; certified milk, requirements and production; pasteurizing, sterilizing, standardizing and modifying; milk laws and inspection; a study of bacteriology relative to milk and dairy work. Must be preceded or accompanied by Animal Husbandry 4. Prerequisite, Course 1; 2 lecture hours and 1 laboratory period. Credit, 3. Assistant Professor LOCKWOOD.

3. BUTTER MAKING. — A study of hand and factory separators, separator construction and cream separation; handling milk and cream for butter making on the farm and in the factory; preparation of home-made and commercial starters, and ripening cream; churning; recording work; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy-building construction; plans for dairy buildings, arrangement, ventilation, light, sanitation; dairy machinery and care thereof; practical mechanics as applied to the creamery; cement construction as related to dairy construction work. Prerequisites, Courses 1 and 2; 2 lecture hours and 1 laboratory period. Credit, 3.
Assistant Professor LOCKWOOD.

4. MANUFACTURED MILK PRODUCTS. — Manufacture of other dairy products than butter. Cheddar and fancy cheeses; condensed milks; whey butter, cottage cheese, ice cream, casein, milk powder, etc.; dairying in other countries; library work. Must be preceded or accompanied by Animal Husbandry 6. Prerequisites, Courses 1, 2 and 3; 2 lecture hours and 1 laboratory period. Credit, 3.
Assistant Professor LOCKWOOD.

Farm Administration.

Elective Courses.

3. Farm Equipment. — A study of the material equipment of the farm aside from the land; farm buildings, their location, plan and arrangement; water supply; fencing problems; farm power; farm machinery; wagons. Prerequisite, Mathematics 5; 2 laboratory periods and 1 lecture hour. Credit, 3.

Professor Foord.

4. Farm Management. — The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts. Prerequisites, Agronomy 1 and 3 and Animal Husbandry 2; 2 lecture or recitation hours and 1 seminar period. Credit, 3. Professor Foord.

Department of Botany.

Professor Stone, Assistant Professor Osmun, Mr. Jennison.

[The object of the courses in botany is to teach those topics pertaining to the science which have a bearing upon economic and scientific agriculture. Undergraduate work extending through five semesters is offered. Considerable latitude is allowed students in the senior year in their electives; and, besides the courses here outlined, students often take up the study of histology or of systematic botany, the microscopic examination of pure and adulterated human and cattle foods, spices and drugs, etc. Students sufficiently prepared are occasionally permitted to undertake special physiological and pathological investigations. A botanical conference is held monthly wherein new problems in botanical science are considered by graduate students and the seniors who elect botany.]

Required Courses.

2. Histology, Physiology, Morphology and Classification of Plants. — This course is divided into two parts: Part I. extends to the first week in May; Part II. occupies the remainder of the semester. Part I.: Devoted to study of the minute structure and the function of stems, leaves, roots and seeds, and of the chemical composition of plant constituents. The laboratory work consists largely of microscopic study of plant structures, with some time devoted to chemical tests for plant constituents. The lectures aim to amplify and interpret the laboratory work, and to explain the inter-relation of structure and function. Part II.: The laboratory periods are employed in the study of morphology and plant analy-

sis. Lectures are given in morphology, ecology, evolution and taxonomy. Each student is required to collect and prepare an herbarium of 75 species of native plants. Gray's "New Manual of Botany" is used in determining and naming plants. Though only one lecture period is scheduled for this course, it is understood that laboratory hours may be used for lectures at the discretion of the instructor. Sophomores; three 2-hour laboratory periods and 1 lecture hour. Credit, 4.

Assistant Professor OSMUN and Mr. JENNISON.

Elective Courses.[1]

3. CRYPTOGAMIC BOTANY. — Systematic study of typical forms of the lower plants (bacteria, algæ, fungi, lichens, mosses and ferns); instruction in laboratory technique and methods, and the making of herbaria of lichens, mosses and ferns. Laboratory work and lectures; field excursions for the purpose of observing environmental habits and collecting material for laboratory study; collateral reading. This course is intended for those students who wish to specialize in biology; its purpose is to afford more thorough scientific training than is offered in Course 5, and students electing this course will attend the lectures in Course 5. Juniors; three 2-hour laboratory periods and 1 lecture hour. Credit, 4.

Assistant Professor OSMUN.

4. CRYPTOGAMIC BOTANY. — This is a continuation of Course 3. Prerequisite, Course 3. Juniors; one 2-hour laboratory period and 1 lecture hour. Credit, 2. Assistant Professor OSMUN.

5. PLANT PATHOLOGY. — This course comprises a study of the common diseases of crops and consideration of the methods for their prevention and control, and is intended especially for students in horticulture and agriculture. Laboratory work and lectures. The work in pathology is preceded by a brief study of the lower cryptogams. Juniors; one 2-hour laboratory and one 1-hour lecture period. Credit, 2.

Professor STONE, Assistant Professor OSMUN and Mr. JENNISON.

7. PLANT PATHOLOGY. — This course includes a study of the diseases of one or more crops and the methods of controlling them. Laboratory work and lectures, together with extensive reading of

---

[1] Students electing any of the junior work may take botany in their senior year, and those specializing in chemistry may take plant physiology in their senior year without having had the junior work in botany.

experiment station literature. The course is intended for those who wish to become more familiar with the diseases of one or more groups of economic plants. Seniors; those students continuing in botany must take Course 8; three 3-hour laboratory periods and 1 lecture period. Credit, 5. Professor STONE.

8. PLANT PATHOLOGY. — As stated in Course 7. Prerequisite, Course 7. Professor STONE.

9. ECONOMIC FUNGI. — This course comprises the study of economic fungi from a taxonomic point of view, and is intended for those who wish a more comprehensive knowledge of the phylogenetic relationships of fungi. Laboratory work and lectures. Tubeuf & Smith's "Diseases of Plants" is used as a guide, with special monographs on fungi and with the more important experiment station literature treating of the life history of fungi. Seniors; must be followed by Course 10; two or three 3-hour laboratory periods and one 1-hour lecture period. Credit, 4 or 5. Professor STONE.

10. ECONOMIC FUNGI. — As stated in Course 9. Prerequisite, Course 9. Professor STONE.

11. PLANT PHYSIOLOGY. — This course is largely experimental, and is especially adapted to the needs of students who are taking chemistry. Laboratory work and lectures; various handbooks on plant physiology. Seniors; must be followed by Course 12; three 3-hour laboratory periods and one 1-hour lecture period. Credit, 5. Professor STONE.

12. PLANT PHYSIOLOGY. — As stated in Course 11. Prerequisite, Course 11. Professor STONE.

13. PHYSIOLOGY AND PATHOLOGY OF SHADE TREES. — This course includes a comprehensive study of the diseases, structure and functions of trees and shrubs, and of every agency which in any way affects shade trees. Laboratory work and lectures; extensive reference reading. Designed for those students who intend to take charge of parks or large estates, or to become tree wardens, city foresters, landscape gardeners or professional advisers and caretakers. Seniors; must be followed by Course 14; two 3-hour laboratory periods and one 1-hour lecture period. Credit, 4. Professor STONE.

14. PHYSIOLOGY AND PATHOLOGY OF SHADE TREES. — As stated in Course 13. Prerequisite, Course 13. Professor STONE.

Department of General and Agricultural Chemistry.

Professor WELLINGTON, Assistant Professor HOWARD, Dr. MACLAURIN, Mr. FOWLER, Mr. SHAW.

[The courses in chemistry aim to teach accurate observation, logical thinking and systematic and constant industry, together with a comprehensive knowledge of the subjects presented. Instruction is given through text-books, lectures and a large amount of laboratory work under supervision. The laboratory work at first consists of the study of the properties of elementary matter, the analysis of simple combinations, and their artificial preparation. This is followed by the quantitative analysis of salts, minerals, soils, fertilizers and the chemistry of various manufacturing industries, especially those of agricultural interest, such as are concerned in the production of sugar, starch and dairy products; the preparation of animal and plant foods, their digestion, assimilation and economic use; and the official analysis of soils, insecticides, fungicides, waters, milk, wine, and other animal and vegetable products.]

Required Courses.

1. THE NON-METALS. — An introduction to chemical laws. The commoner non-metallic elements, their occurrence in nature, and their uses in the arts, are studied. Lectures and laboratory exercises; Alex. Smith's "General Inorganic Chemistry." Freshmen; 4 hours. Credit, 3. Assistant Professor HOWARD.

2. THE COMMON METALS. — This course extends the study of Course 1 to the metals common in the arts, and includes blowpipe analysis and elementary determinative mineralogy. Lectures, recitations and laboratory exercises. Prerequisite, Course 1. Freshmen; 4 hours. Credit, 3. Assistant Professor HOWARD.

Elective Courses.

4. QUALITATIVE AND QUANTITATIVE ANALYSIS. — A two-part course for students who wish to become acquainted with only a limited field of analysis. Lectures and laboratory work; Treadwell-Hall's "Analytical Chemistry." Prerequisite, Course 2; sophomores; 6 hours. Credit, 3. ————————

5. ORGANIC CHEMISTRY. — A systematic study of the origin and relationships of carbon compounds, particularly those occurring in plants and animals. Prerequisite, Course 4. Juniors; lectures 3 hours, laboratory 2 hours. Credit, 4. Dr. MACLAURIN.

6. CHEMISTRY OF PLANT AND ANIMAL LIFE. — In this course the commoner chemical reactions in plant and animal bodies are

studied. The ordinary processes of digestion, assimilation, secretion and excretion are examined in detail. Prerequisite, Course 5. Juniors; lectures 3 hours, laboratory 2 hours. Credit, 4.

---

7. Chemistry of Plant and Animal Life. — This course takes up the study of physiological chemical processes beyond the scope of Course 6, and is open only to students who have attained marked proficiency in that course. By arrangement. Credit, 5.
Mr. Shaw.

9. Advanced Analysis. — For those who wish to acquire skill in chemical analysis. Students intending to enter experiment-station or chemical-control work have here an opportunity to become familiar with the processes concerned. Prerequisite, Course 5. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5.
Professor Wellington.

10. Advanced Analysis. — As stated under Course 9. Prerequisite, Course 9. Credit, 5.
Professor Wellington.

11. Physical Chemistry. — Prerequisites, Courses 4 and 5. Seniors; lectures 2 hours. Credit, 2.

---

12. Analysis of Foods and Fodders. — Prerequisite, Course 5. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5.
Mr. Fowler.

14. Analysis of Fertilizers, Insecticides and Fungicides. — Prerequisite, Course 4. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5. Professor Wellington.

16. Chemistry of Sugar Making and Refining. — Prerequisite, Course 5. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5. Professor Wellington.

Department of Entomology.

Prof. C. H. Fernald, Prof. H. T. Fernald, Mr. Summers.

[A knowledge of insects is of importance in every department of life, and particularly in connection with agriculture, horticulture, biology, landscape gardening and forestry; it therefore forms part of a general education. An introductory course in this subject is accordingly offered in the junior year. For those who desire a further knowledge of the subject, because of its importance to their future occupation, a senior course is also offered, so arranged as to be of especial value for those who expect to take up agriculture, horticulture, landscape gardening, forestry or science teaching.]

Elective Courses.

2. General and Economic Entomology. — This course comprises studies in the structure of insects as applied to their identification, and in the principles of classification; a systematic examination of the different groups and of the most important economic insects of each group, including their life histories and habits, recognition of their work as shown in the collection and in the field, and methods for their control. The most important insecticides, and their preparation and application with different kinds of apparatus, are also treated. Field work in collecting insects is a part of the course; and this is accompanied by laboratory work on methods of pinning, pressing and mounting insects, and of classifying them. Juniors; four 1-hour lecture periods till about May 1; thereafter one 1-hour lecture period and three 2-hour laboratory or field periods. Credit, 4. Prof. H. T. Fernald.

3. Advanced Entomology. — This course is subdivided according to the particular needs of those taking it, and is to a large degree given in the form of individual instruction.

A. *Morphology.* — Careful studies of the structure of insects belonging to each of the larger and more important orders, together with lectures on the subject, followed by the identification of insects of each of these groups and the study of the collections, to teach the use of the analytical tables and of structural characters in the determination of insects.

B. *Histology.* — Lectures on the internal anatomy and the histology of the various organs, with particular reference to those affected by the various insecticides.

C. *Insecticides and Apparatus.* — Lectures on the chemistry, preparation and application of the different insecticides, their merits and defects, tests for detecting adulterations; and a study of other methods of insect control, together with laboratory work on adulterated materials.

D. Coccidology. — Laboratory work on methods of preserving, mounting and identifying scale insects, particular attention being given to those of greatest economic importance.

E. Bibliography. — Studies of the various sources of entomological publications and of the methods of finding the literature on any insect.

F. Special Studies. — In these studies the insects most closely related to the future occupation of the student will receive attention.

The results of these studies are brought together in the form of an essay or thesis; this will include all the essentials of what is known of the structure, life history, habits and injuries caused by each insect studied, together with methods of treatment, and a list of the best articles found in the course of the work. Comstock's "Manual for the Study of Insects" is used in the laboratory work. Seniors; prerequisite, Entomology 2; students electing 3 must also take 4; one 1-hour lecture period and three 2-hour laboratory or field periods. Credit, 4.

Profs. C. H. FERNALD and H. T. FERNALD and Mr. SUMMERS.

4. ADVANCED ENTOMOLOGY. — As stated in Course 3. Prerequisite, Course 3.

Profs. C. H. FERNALD and H. T. FERNALD and Mr. SUMMERS.

DIVISION OF HORTICULTURE.

Professor WAUGH, Professor SEARS, Assistant Professor WHITE, Mr. TOMPSON, Mr. RANE, Mr. GRACEY.

DEPARTMENTS.

Horticulture.
Pomology.
Floriculture.
Landscape Gardening.
Market Gardening (Section).
Drawing (Section).

Department of Horticulture.

[The general subject of horticulture divides naturally into the subjects of pomology, floriculture, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore here grouped under the general designation of Horticulture.]

Required Courses.

2. NURSERY PRACTICE. — This course treats of the fundamental operations of horticulture — propagation, pruning, cultivation —

as related to the physiology of the plant. Lectures and practicums; Bailey's "Nursery Book" as text in propagation. Sophomores; 2 hours. Credit, 2. Professor SEARS.

Elective Courses.

3. ARBORICULTURE. — This course aims to make the students familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them. Prerequisite, Horticulture 2. Juniors; 2 lecture periods and 1 laboratory period. Credit, 3.

Assistant Professor WHITE.

4. PLANT BREEDING. — This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops. Seniors and graduates; open only to students well prepared in agricultural or horticultural subjects; 2 lecture periods and one 2-hour laboratory period. Credit, 3.

Professor WAUGH.

5. THE LITERATURE OF HORTICULTURE. — A broad seminar course, with extended readings, covering the entire field of horticulture. Typical modern works are first studied, including representative authors and the leading publishers. Consideration is given to books, periodicals and bulletins of all kinds, with a view to securing a comprehensive view and a working knowledge. Study and reference methods are given special attention. After a good command of current literature is secured, older works are taken up and the forces and direction of development are pointed out. A special study is made of the old herbals. Finally, the relation of horticultural literature to horticultural practice is summarily sketched. Graduates and undergraduates. Credit, 2.

Professor WAUGH.

A. Forestry. — A short course of lectures and field exercises, to introduce students to the general principles of forestry management, including nursery work, sylviculture, forest mensuration and exploitation, with special reference to the management of farm woodlots. This course is given annually by special arrangement with the State Forester of Massachusetts.[1] Mr. RANE.

Department of Pomology.

Elective Courses.

1. PRACTICAL POMOLOGY. — *General.* — A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of stock, pruning, spraying, etc. Text and reference books; field and laboratory exercises. Prerequisite, Horticulture 2. Juniors; 5 hours. Credit, 3. Professor SEARS.

2. PRACTICAL POMOLOGY. — *Special.* — The special application of the general principles discussed in Course 1 to the culture of the principal kinds of fruits, such as apples, pears, peaches, plums, cherries and quinces; grape culture and the culture of small fruits, such as blackberries, raspberries, currants, gooseberries and strawberries. Text-books, lectures and reference books; field and laboratory exercises. Prerequisites, Horticulture 2 and Pomology 1. Juniors; 5 hours. Credit, 3. Professor SEARS.

3. SYSTEMATIC POMOLOGY. — A study of the varieties of the different fruits and of nomenclature and the identification of varieties, with critical descriptions and special reference to relationships and classifications. Text-books, laboratory and field exercises. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 5 hours. Credit, 3. Professor SEARS.

4. COMMERCIAL POMOLOGY. — The storing and marketing of fruits; includes a discussion of storage houses, the handling and storing of fruits, fruit packages, methods of grading and packing, etc. Text and reference books; laboratory exercises. Seniors; prerequisites, Horticulture 2, Pomology 1, 2 and 3; 5 hours. Credit, 3. Professor SEARS.

Department of Floriculture.

Elective Courses.

1. GREENHOUSE MANAGEMENT. — This course is designed to familiarize students with methods followed in the management of greenhouse crops. The students are instructed in the practical

---

[1] Additional courses in forestry for the year 1909–10 will be announced soon.

operation of greenhouse watering, fumigating and ventilating, in the care of furnaces, and in the methods of propagation of greenhouse plants by seeds, cuttings, budding and grafting. This is designed as a laboratory course, and students electing it will be expected to arrange their hours according to the needs of the work. Prerequisite, Horticulture 2. Juniors; 7 hours a week. Credit, 3.
Assistant Professor WHITE.

2. GREENHOUSE DESIGN AND CONSTRUCTION. — A study of the location, arrangement and construction of greenhouses; the drawing of plans for commercial and private ranges, to show foundations and details in construction of superstructure; arrangement of heating pipes; estimates of comparative cost of different methods of construction; drafting specifications. Juniors; prerequisites, Floriculture 1; 5 hours. Credit, 3.
Assistant Professor WHITE.

3. FALL GREENHOUSE CROPS. — A study of important fall and winter crops and their care, — chrysanthemums, carnations, violets, roses, palms, and the like; the importation, purchase and growth of bulbous material; the preparation of material for forcing; design making; house and church decorating. Lectures, text-books and laboratory exercises. Prerequisites, Floriculture 1 and 2. Seniors; 5 hours. Credit, 3. Assistant Professor WHITE.

4. SPRING GREENHOUSE CROPS. — The culture of individual crops in their relation to spring work in a florist establishment. A critical study of methods of propagating bedding plants, the nature and use of these plants, practice in planting them and in the spring care of herbaceous perennials and wholesale and retail marketing of spring plants. Lectures, text-books and practical exercises. Seniors; prerequisite, Floriculture 1, 2 and 3; 5 hours. Credit, 3.
Assistant Professor WHITE.

Department of Landscape Gardening.

Elective Courses.

1. ELEMENTS OF LANDSCAPE GARDENING. — Reconnoissance surveys and mapping; detailed study of selected works of leading landscape gardeners; grade design, road design and field work. Students should have preparation in surveying, mathematics, arboriculture and drawing. Must be followed by Course 2. Juniors; 7 hours a week. Credit, 4. Professor WAUGH and Mr. GRACEY.

2. Elements of Landscape Gardening. — As stated under Course 1. Prerequisite, Course 1.
Professor Waugh and Mr. Gracey.

3. General Landscape Gardening. — Field notes; examination of completed works and those under construction; design of architectural details; planting plans; estimates; written reports of individual problems. Seniors; prerequisites, Landscape Gardening 1 and 2, and either arboriculture (Horticulture 3) or advanced mathematics; must be followed by Course 4; 7 hours. Credit, 4.
Professor Waugh.

4. General Landscape Gardening. — As stated under Course 3. Prerequisite, Course 3. Professor Waugh.

5. Theory of Landscape Art. — The general theory and applications of landscape study, including a brief history of the art. Seniors and graduates; 2 hours. Credit, 2.
Professor Waugh.

6. Ornamental Gardening. — An elementary course for students who take no other work in landscape gardening. The general principles and their simpler applications, such as the ornamental planting of farm yards, school grounds and streets, the care of estates, etc. Text-book, Waugh's "Landscape Gardening." 3 hours. Credit, 3. Mr. Gracey.

Market Gardening.

Elective Courses.

2. Elements of Market Gardening. — This course consists of a study of the elements and fundamental problems of market gardening, with careful study of such subjects as garden soils, garden fertilizers and systems of planting and cultivation. The principal garden crops are studied. Lectures and practical exercises. Juniors; prerequisite, Horticulture 1; 3 hours. Credit, 3.
Mr. Tompson.

3. Advanced Market Gardening. — A continuation of the work begun in Market Gardening 2, taking up problems of harvesting, storing and marketing. Considerable time is devoted to growing vegetables under glass, and special and novel vegetable

crops are studied. Careful note-taking and considerable collateral reading are required. Floriculture 1 must be taken in connection with this course. Seniors: prerequisite, Market Gardening 2; 5 hours. Credit, 3. Mr. TOMPSON.

Drawing.

Elective Courses.

[1. FREEHAND DRAWING. — Lettering; sketching from type models, leaves, fruits, vegetables, flowers and trees, insects and small animals; laying flat and graded washes in water colors; water-color rendering of fruits, vegetables, leaves, flowers and trees; topographical lettering and conventional signs in ink; conventional coloring; mapping in ink and in water colors. Not given in 1909–10. Juniors; 6 hours. Credit, 3. Mr. GRACEY.]

2. MECHANICAL DRAWING. — Inking exercises; geometric problems; projection; intersections; isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Juniors; 6 hours. Credit, 3. Mr. GRACEY.

DIVISION OF THE HUMANITIES.

Professor MILLS, Assistant Professor NEAL, Assistant Professor HOLCOMB, Mr. MACKIMMIE, Mr. ASHLEY, Mr. GREEN.

DEPARTMENTS.

English.
Modern European Languages.
Music (Section).
Political Science.
Library.

Department of English.

English Language.
Literature.
Public Speaking.

[Enrolment in the elective courses in the Department of English is subject to the approval of the instructor. The membership in several of the courses is strictly limited; hence students are advised to plan their work well in advance in order to be sure of completing the required three hours of post-sophomore English. This credit must be made up without taking Literature 15 or 16. In each semester, the students enrolled in elective courses in English are expected to take part in the meetings of the English Conference, which consists of the instructors and students in the Department of English. The meetings of the Conference are held once every four weeks, or oftener, between October 1 and June 7.]

ENGLISH LANGUAGE.

Required Courses.

1. FRESHMAN ENGLISH. — Composition; introduction to literature. Recitations and lectures; theme writing; conferences[1] weekly or fortnightly; declamation at option of instructor. Freshmen; 5 hours. Credit, not including declamation, 4; including declamation, 5. The DEPARTMENT.

2. FRESHMAN ENGLISH. — As stated under Course 1. Prerequisite, Course 1. The DEPARTMENT.

3A and 3. SOPHOMORE ENGLISH. — Composition; literature. These courses supplement Courses 1 and 2, and add instruction in the use of the library. Course 3 open only to sophomores whose work in Courses 1 and 2 reaches a standard satisfactory to the department; Course 3A required of all others. Prerequisite, Course 2; sophomores; 2 hours for 3A, 1 hour for 3. Credit, 2 and 1 respectively. The DEPARTMENT and Mr. GREEN.

4A and 4. SOPHOMORE ENGLISH. — As stated under Courses 3A–3, which are respectively prerequisite to these courses. The DEPARTMENT and Mr. GREEN.

5. TRAINING COURSE. — A special course that follows and enlarges upon the study outline of Courses 1 and 2. Required of the readers in English; open, with approval of instructor, to candidates for appointment as readers, and therefore may be taken with full credit by approved sophomore students in place of English 3 and 4. One hour, with a second hour at the option of the instructor. Credit, 2. The DEPARTMENT.

6. TRAINING COURSE. — As outlined under Course 5. . The DEPARTMENT.

Elective Courses.

[7. ADVANCED COMPOSITION. — A course varying in plan, but usually concerned with some form of exposition, description or narration. In 1908–09, it dealt mainly with narration and character portrayal. Lectures or text-book assignments; studies of types; exercises; long papers. Given every other year; not given in 1909–10. Two hours, with a third hour at the option of the instructor. Credit, 2. Assistant Professor NEAL.]

---

[1] Student theme-readers for 1908–09: Herbert Linwood White, '09; Josiah Chase Folsom, '10; Samuel Weis Mendum, '10; George Murray Brown, Jr., '09 (first semester); Charles Howard White, '09 (first semester); Henry Alvan Brooks, '10 (second semester); Edward Harrison Turner, '10 (second semester).

9. AGRICULTURAL JOURNALISM. — Lectures as in Course 11, and the production of "copy" adapted to the use of agricultural periodicals. The class, organized as an editorial staff, is charged with the publication of an agricultural periodical (see Course 11). This periodical is submitted for discussion to the Stockbridge Club. The instructors in the agricultural subjects criticise the substance of the articles; the instructor in the course criticises style and "make-up." Given every other year; to be given in 1909–10. Students enrolling must, to secure credit, also take Course 10. One hour, with a second hour at the option of the instructor. Credit, 1. Assistant Professor NEAL.

10. AGRICULTURAL JOURNALISM. — As stated under Course 9. Prerequisite, Course 9. Assistant Professor NEAL.

11. PERIODICAL WRITING. — Lectures on the elements of journalism — newspaper and magazine writing, reporting, editing, printing, etc. — and the production of "copy" under conditions as nearly as possible like those under which newspaper and magazine writing is carried on. The class, organized as an editorial staff, is to issue a periodical. It is responsible for "covering" events; determining the subjects to be treated and the manner of treatment; accepting and rejecting articles; desk editing, copy and proof reading; making "dummies" and writing legends for illustrations; completing "forms" and "publishing" the periodical upon schedule time, etc. Given every other year; to be given in 1909–10. Two hours, with a third hour at the option of the instructor. Credit, 2. Assistant Professor NEAL.

[13. PROSEMINAR IN JOURNALISM. — Informal, beginning with a study by individual students of editorial writing and of types of magazine writing, such as "descriptive" articles, research articles, "human interest" articles, and articles in "popularized" science. Members of the class are expected to formulate through these studies theories of journalism and journalistic writing, to state them in thesis form and to produce articles of the kinds studied. Reference reading and reports upon current periodicals may be

called for. Prerequisite, either Course 11 or Courses 9 and 10. Given every other year; not given in 1909–10. One hour, with a second hour at the option of the instructor. Credit, 1.
Assistant Professor NEAL.]

[14. PROSEMINAR IN JOURNALISM. — As stated under Course 11.
Assistant Professor NEAL.]

15. ENGLISH LANGUAGE. — See Literature 15.
16. ENGLISH LANGUAGE. — See Literature 16.

LITERATURE.

Required Courses.

1, 2, 3A, 3, 4A, 4, 5 and 6. — See the courses so numbered under English Language.

Elective Courses.

7. INDIVIDUAL READING. — Cultural reading courses. Students must, when enrolling, present in writing a detailed statement of the reading they purpose to do. The reading must be sufficient to require forty-five hours; must be strictly non-technical; may be in any subject; and may be taken in any department by arrangement between the student and the instructor in the department concerned. If the reading be taken outside the Department of English, the student must, before presenting his outline of reading, secure in writing the endorsement thereof by the instructor under whom he is to read. Each student must prepare a two thousand word thesis upon his reading, and this thesis must be presented by the fourth Wednesday before the beginning of senior examinations. It must be accompanied with a written statement from the supervising instructor that the reading as outlined has been satisfactorily completed, and that the thesis is satisfactory in subject-matter. Prerequisite, the sophomore courses in English; total credits allowed on Courses 7 and 8 in any two years, 2. Credit, 1.
The DEPARTMENT.

8. INDIVIDUAL READING. — As stated under Course 7.
The DEPARTMENT.

9. ELIZABETHAN LITERATURE (1557–1637). — Lectures, textbook or reference assignments, or class-room interpretation of authors; much outside reading; written studies upon announce-

ment. Not given in 1910–11. Prerequisite, the sophomore courses in English. Two hours, with a third hour at the option of the instructor. Credit, 2. Assistant Professor NEAL.

10. PURITAN AND RESTORATION LITERATURE (1616–1700). — The same in plan, requirements and hours as Course 9. Not given in 1910–11. Assistant Professor NEAL.

[11. EARLY EIGHTEENTH CENTURY LITERATURE (1700–1740).[1] — The same in plan, requirements and hours as Course 9. Not given in 1909–10; given in 1910–11.
Assistant Professor NEAL.]

[12. MIDDLE EIGHTEENTH CENTURY LITERATURE (1740–1780).[1] — The same in plan, requirements and hours as Course 9. Not given in 1909–10; given in 1910–11.
Assistant Professor NEAL.]

[13. TRANSITION EIGHTEENTH–NINETEENTH CENTURY LITERATURE (1780–1815).[1] — The same in plan, requirements and hours as Course 9. Not given in 1909–10; given in 1911–12.
Assistant Professor NEAL.]

[14. EARLY NINETEENTH CENTURY LITERATURE (1800–1832).[1] — The same in plan, requirements and hours as Course 9. Not given in 1909–10; given in 1911–12.
Assistant Professor NEAL.]

18. ADVANCED LITERARY STUDY. — This course varies from year to year. It will usually provide opportunity either for intensive study of great writers or for study of the historical development or the structure and characteristics of literary types. Prerequisite, the sophomore courses in English; but those students who have taken or are taking courses in literary history or general reading will be the better prepared to take Course 18 with profit. In 1909–10, Shakspere; in 1910–11, the English novel. — Shakspere: The interpretation of two plays in class and the reading of three others outside; the life of Shakspere; collateral reading. Tests and examinations. Two hours, with a third hour at the option of the instructor. Credit, 2. Assistant Professor NEAL.

---

[1] In 1908–09, Courses 11–14 were given as a single course, open to juniors only.

15. English Language and Literature. — The origin, history and development of the English language; essayists and novelists of the nineteenth century. Continuous with Course 16. Seniors; 3 hours. Credit, 3. Professor Mills.

16. English Language and Literature. — Continuous with Course 15. The elements of literary criticism; nineteenth century poets. Seniors; 3 hours. Credit, 3. Professor Mills.

Public Speaking.

Required Courses.

1. Declamation. — Freshman course, included under Courses 1 and 2 in English Language. A credit amounting to 1 hour for one semester is given in Courses 1 and 2 together.

---

2. Declamation. — As in Course 1.

Elective Courses.

3. Oration. — Announcement to be made.

---

4. Argumentation and Debate. — Announcement to be made.

Department of Modern European Languages.

French.

Required Courses.

1. Elementary French. — A beginning course. Frazer & Squair's "French Grammar;" reader; graduated texts. Required of freshmen presenting German for entrance who do not continue that language and have not studied French; open upon arrangement to other students. Freshmen; 4 hours. Credit, 4. Mr. Mackimmie.

2. Elementary French. — As stated under Course 1. Prerequisite, Course 1. Mr. Mackimmie.

A1. Second-year French. — Elementary and easy sight reading; grammar, Frazer & Squair's "Grammar," part II.; composition and reports. Intended for those freshmen who enter in 1909 under the old requirements with only one year of French; not to be given after 1909–10. Freshmen; 4 hours. Credit, 4.

Mr. MACKIMMIE.

A2. SECOND-YEAR FRENCH. — As stated under Course A1. Prerequisite, Course A1. Mr. MACKIMMIE.

3. INTERMEDIATE FRENCH (third year). — Training for rapid reading; the reading of a number of standard novels and plays; composition; reports on collateral reading from periodicals and scientific texts in the library. Required of freshmen who present two years of French for entrance and do not take German, and of sophomores who take Courses 1 and 2 as freshmen; open upon arrangement to other students; 4 hours. Credit, 4.

Mr. MACKIMMIE.

4. INTERMEDIATE FRENCH. — As stated under Course 3, but not required of sophomores who take Courses 1 and 2 as freshmen. Prerequisite, Course 3. Mr. MACKIMMIE.

5. ADVANCED FRENCH (fourth year). — A reading course; representative masterpieces of the nineteenth century; collateral reading and written reports. Required of sophomores who take Courses 3 and 4 as freshmen; open upon arrangement to other students. Prerequisite, Course 4; 3 hours. Credit, 3.

Mr. MACKIMMIE.

Elective Courses.

6. ADVANCED FRENCH (fourth year). — A general view of the history of French literature. Several plays of the great classical dramatist will be read. Prerequisite, Course 5. Sophomores; open upon arrangement to other students; 3 hours. Credit, 3.

Mr. MACKIMMIE.

7 and 8. FRENCH LANGUAGE OR LITERATURE (fourth year). — Courses in more advanced subjects; to be announced; 3 hours. Credit, 3. Mr. MACKIMMIE.

SPANISH.

Elective Courses.

1. ELEMENTARY SPANISH. — Grammar, with special drill in pronunciation; reading from a simple reader. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.

Mr. MACKIMMIE.

2. Modern Spanish Authors. — Reading from modern Spanish novel and drama. Prerequisite, Course 1. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. Mackimmie.

German.

Required Courses.

1. Elementary German. — Grammar and composition; the reading of short stories, poems, plays, etc. Required of those presenting French for entrance who do not continue that language and have not studied German. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Mr. Ashley.

2. Elementary German. — As stated under Course 1. Prerequisite, Course 1. Mr. Ashley.

3. Intermediate German. — Rapid reading of selected works from Schiller, Goethe, Lessing and others; review of grammar; outside readings. Required of freshmen who present German for entrance and do not take French, and of sophomores who took Courses 1 and 2 as freshmen. Freshmen and sophomores; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. Ashley.

4. Intermediate German. — As stated under Course 3, but not required of sophomores who took Courses 1 and 2 as freshmen. Prerequisite, Course 3. Mr. Ashley.

5. Advanced German. — The rapid reading of selections from the best authors (novels and dramas); outside reading in German periodicals of selected articles concerning various subjects and designed to promote research and reference work. Prerequisite, Course 4. Sophomores; required of those who took German 3 and 4 as freshmen; open upon arrangement to other students; 3 hours. Credit, 3. Mr. Ashley.

Elective Courses.

6. Advanced German. — As stated under Course 5; sophomores; open upon arrangement to other students. Prerequisite, Course 5; 3 hours. Credit, 3. Mr. Ashley.

7. Readings and Investigations. — The reading of novels and journals; presentation by members of class of reports on period-

ical articles; reports upon assigned reference work in encyclopedias; 3 hours. Credit, 3. Mr. Ashley.

8. Readings and Investigations. — As stated under Course 7. Mr. Ashley.

Music.

Elective Courses.

1. History and Interpretation of Music. — The lives and works of famous composers from Händel to Grieg, with exposition on the pianoforte of representative works; text-book; 1 hour. Credit, 1. Mr. Ashley.

Department of Political Science.

Required Courses.

1. Economics. — Text-books and assigned reading. For reference reading the class is divided into six groups, each student being allowed to choose any one of six subjects of investigation, according to his tastes and probable future career. The class is acquainted with the substance of the reading assigned to each group by means of weekly papers read by members of the respective groups. Must be taken as a prerequisite to graduation; 3 hours. Credit, 3.
Assistant Professor Holcomb.

Elective Courses.

2. Government. — The local, State and federal governments of the United States, and the constitutional history of Massachusetts; features of local government peculiar to Massachusetts or to New England; lectures on the history of political parties. Emphasis is laid on the period beginning with the close of the civil war. Text-books and lectures; 3 hours. Credit, 3.
Assistant Professor Holcomb.

4. Economic History. — The economic history of England to the reign of Henry VIII.; the history of England and the American colonies in conjunction to 1783; and thereafter the history of England and of the United States. Emphasis is laid on economic history, but the more important political and religious movements are treated in their economic relations. Text-books, lectures and assigned reading; 3 hours. Credit, 3.
Assistant Professor Holcomb.

5. THE HISTORY OF NEW ENGLAND. — In this course, New England is regarded as a unit. Although the history of agriculture and rural life is treated with special fullness, ample attention is given to political, religious and ethical history. It is hoped that the student will not only be led to an intelligent understanding of present economic conditions, but will also be imbued with a progressive loyalty to the highest ideals of the New England of the past. Lectures and required reading. Given every other year; given in 1909–10; 3 hours. Credit, 3. Assistant Professor HOLCOMB.

[7. THE HISTORY OF IDEALS. — This course is intended to supplement Course 4, treating history from the idealistic, rather than from the economic, point of view. It attempts to define the great ideals which have impelled the most important social, political, esthetic, ethical and religious movements of medieval and modern history, and to trace the causes of the success or failure of the movements to which these ideals have led. The ideals of Christianity, including monasticism, modern Catholicism and Protestantism; of medieval art and architecture; of political and social democracy, including universal suffrage, the abolition of slavery, modern socialism and social reform — may be taken as examples. Lectures and required reading. Although Course 4 is not a prerequisite to this course, students should take both. Given every other year; not offered in 1909–10; 3 hours. Credit, 3.
Assistant Professor HOLCOMB.]

Department of Mathematics, Physics and Civil Engineering.

Professor OSTRANDER, Associate Professor HASBROUCK, Mr. DUNCAN.

Required Courses.

1. HIGHER ALGEBRA. — A brief review of radicals, quadratic equations, ratio and proportion, and progressions; binomial theorem, undetermined coefficients, summation of series, continued fractions, logarithms, theory of equations. Wells's "College Algebra." Freshmen; 5 hours a week. Credit, 5.
Associate Professor HASBROUCK and Mr. DUNCAN.

2. SOLID GEOMETRY. — Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical

triangles and the measurement of surfaces and solids. Wells's "Solid Geometry." Freshmen; required unless accepted for admission; 2 hours. Credit, 2. Mr. DUNCAN.

4. PLANE TRIGONOMETRY. — The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry." Required unless accepted for admission. Freshmen; 3 hours. Credit, 3.
Associate Professor HASBROUCK.

5. GENERAL PHYSICS. — Elementary mechanics and heat. Lectures, recitations and laboratory work. Text, Crew's "General Physics." Sophomores; 4 hours class-room work and 1 laboratory period. Credit, 5.
Adjunct Professor HASBROUCK and Mr. DUNCAN.

Elective Courses.

6. GENERAL PHYSICS. — Electricity and light. Crew's "General Physics." Lectures, recitations and laboratory work. Sophomores; 2 hours of class-room work and 1 laboratory period. Credit, 3.
Adjunct Professor HASBROUCK and Mr. DUNCAN.

[9. ADVANCED PHYSICS. — The senior elective in physics will not be offered for the year 1909–10.
Adjunct Professor HASBROUCK.]

8. PLANE SURVEYING. — The elements of the subject, including the adjustment and use of the usual instruments. Text-book and lectures. Sophomores; 6 hours a week. Credit, 3.
Professor OSTRANDER and Mr. DUNCAN.

7. ANALYTIC GEOMETRY. — A discussion of the geometry of the line, the circle, of conic sections and of the higher plane curves. Wentworth's "Analytic Geometry." Prerequisites, Mathematics 1, 2 and 4; 3 hours a week. Credit, 3. Professor OSTRANDER.

10. — DIFFERENTIAL AND INTEGRAL CALCULUS. — A first course in the subject, with some of the more important applications. Nichol's "Differential and Integral Calculus." Prerequisites, Mathematics 1, 2, 4 and 7; 5 hours. Credit, 5.
Professor OSTRANDER.

11. HYDRAULICS AND SANITARY ENGINEERING.[1] — Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Text-book and lectures, 3 hours. Not given in 1910–11. Credit, 3.
Professor OSTRANDER.

12. ADVANCED SURVEYING.[1] — Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Text-book and lectures. Not given in 1910–11; 6 hours. Credit, 5. Professor OSTRANDER.

[13. STRESSES IN STRUCTURES.[1] — An elementary course in roof and bridge stresses. Text-book and lectures. Not given in 1909–10; 4 hours. Credit, 3. Professor OSTRANDER.]

[14. STRENGTH OF MATERIALS, FOUNDATIONS AND MASONRY CONSTRUCTION.[1] — Text-book and lectures. Not given in 1909–10; 5 hours. Credit, 5. Professor OSTRANDER.]

[15. ANALYTIC MECHANICS. — A course in theoretical mechanics, based on the calculus, with applications to problems. Text-book and lectures. Prerequisites, Mathematics 7, 10; not given in 1909–10; 3 hours. Credit, 3. Professor OSTRANDER.]

Department of Military Science and Tactics.

Captain MARTIN.

[The department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-years course must take for three years three full hours a week of physical training. This work must be under college supervision, and be completed by the beginning of the senior year. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the courses in Military Science are given up to the Christmas recess and from the close of the spring recess to the end of the semester each year; the corresponding courses in Physical Education occupy the intervening time.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

---

[1] Instruction in civil engineering will be given in two distinct courses of one year each, the courses alternating. The courses are open to students of the junior and senior classes.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

A dark blue uniform, old army pattern, costing about $15, is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $15 with the college treasurer to cover the cost of the uniform. The sale of old uniforms to members of an entering class is prohibited, unless the consent of the military instructor be obtained.]

Required Courses.

1. Introduction to Military Science and Tactics. — Practical instruction in infantry drill regulations through the school of the battalion in close and extended order; advance and rear guards; outposts; marches; ceremonies; guard duty. Upon the conduct and proficiency of this year depends the appointment of corporals for the ensuing year. Freshmen; first semester until Christmas recess and second semester after Easter recess; 3 hours. Credit, 2.
Captain Martin.

2. Introduction to Military Science and Tactics. — As stated under Course 1. Captain Martin.

3. Practice and Theory of Military Science and Tactics. — Practical instruction as before; pointing, aiming and sighting drills; litter drills, and first aid to the injured by detachment; target practice, in gallery and on the range. Theoretical instruction in infantry drill regulations, to include the school of the company; manual of guard duty; small arms firing regulations. Corporals are appointed from this class. On their conduct and proficiency depends the appointment of sergeants in the next class. Sophomores: first semester until Christmas recess and second semester after Easter recess; 3 hours, with an average in addition of 1 hour of instruction in theory for the full year. Credit, 2.
Captain Martin.

4. Practice and Theory of Military Science and Tactics. — As stated under Course 3. Captain Martin.

5. Practice and Theory of Higher Military Science and Tactics. — Practical instruction as before; target practice, in gal-

lery and on the range. Theoretical instruction in infantry drill regulations; to include the school of the battalion; advance and rear guards; outposts; marches and ceremonies; field service regulations; preparation of reports, returns, muster rolls, enlistment and discharge papers, rosters, requisitions, etc.; army regulations; lectures on military science. Sergeants are appointed from this class. On their conduct and proficiency depends their selection as officers for the ensuing year. When necessary, officers will also be appointed from this class. Juniors; first semester until Christmas recess and second semester after Easter recess; 3 hours, with an average in addition of 1 hour of instruction in theory for the full year. Credit, 2. Captain MARTIN.

6. PRACTICE AND THEORY OF HIGHER MILITARY SCIENCE AND TACTICS. — As stated under Course 5. Captain MARTIN.

Elective Courses.

7. ADVANCED MILITARY SCIENCE AND TACTICS. — Practical instruction as before; conduct of drills of lower classes. Officers will as a rule be selected from this class. Cadets electing Courses 7 and 8 must make the election for the year, and not later than the first Monday in June of their junior year. No cadet electing this course will after the commencement drill be permitted to change his election without the consent of the dean of the faculty and of the commandant. Seniors electing Courses 7 and 8 are required to report for three hours of work a week in the Department of Physical Education when drill is suspended. Seniors; first semester until Christmas recess and second semester after Easter recess; 3 hours. Credit, 2. Captain MARTIN.

8. ADVANCED MILITARY SCIENCE AND TACTICS. — As stated under Course 7. Captain MARTIN.

Department of Physical Education and Hygiene.

Assistant Professor REYNOLDS.

HYGIENE.

Required Courses.

1. HYGIENE. — Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation. Freshmen; 1 hour. Credit, 1. Assistant Professor REYNOLDS.

PHYSICAL EDUCATION.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in Military Science. All classified undergraduate students are given a physical examination upon entering. A similar examination is given at the beginning of the athletic seasons to all candidates for training for class or college athletic contests.]

Required Courses.

1. ELEMENTARY GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 2. Freshmen; 3 hours. Credit, 2. Assistant Professor REYNOLDS.

2. ELEMENTARY GYMNASTICS. — As stated under Course 1. Assistant Professor REYNOLDS.

3. GRADED GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 4. Sophomores; 3 hours. Credit, 2. Assistant Professor REYNOLDS.

4. GRADED GYMNASTICS. — As stated under Course 3. Assistant Professor REYNOLDS.

5. HEAVY GYMNASTICS. — Drills, games and athletics; from January 1 to April 1, in connection with Course 6. Juniors; 3 hours. Credit, 2. Assistant Professor REYNOLDS.

6. HEAVY GYMNASTICS. — As stated under Course 5. Assistant Professor REYNOLDS.

Elective Courses.

7. TRAINING COURSE. — Leadership of class and squad work; supervision of indoor and outdoor athletic contests and games; boxing and wrestling. Seniors; 3 hours. Credit, 2. Assistant Professor REYNOLDS.

8. TRAINING COURSE. — As stated under Course 7. Assistant Professor REYNOLDS.

9. ADVANCED GYMNASTICS. — For those who wish to become candidates for the gymnastic team. Credit, 0. Assistant Professor REYNOLDS.

10. ADVANCED GYMNASTICS. — As stated under Course 9. Assistant Professor REYNOLDS.

Department of Rural Social Science.

President BUTTERFIELD, Mr. LYMAN, Dr. CANCE.

AGRICULTURAL ECONOMICS.

Required Courses.

2. AGRICULTURAL INDUSTRY AND RESOURCES. — A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions. Sophomores; 3 hours. Credit, 3. Dr. CANCE.

Elective Courses.

4. ELEMENTS OF AGRICULTURAL ECONOMICS. — This course is designed to follow the required work in the elements of economics. It will consider the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; the agricultural market; determination of price; speculation; problems of land tenure and land values; business co-operation; farmers' organizations; the farmer and legislation; the maintenance of the social, political and economic status of the farmer; and the relation of the farmer to the State. Lectures, text, readings, topics and field work; 3 hours. Credit, 3. Dr. CANCE.

5. HISTORICAL AND COMPARATIVE AGRICULTURE. — A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on present conditions and the history of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, to show that the agriculture of any country is a distinct individual problem, and to ascertain the causes now working to affect agricultural changes. Lectures, readings and library work. Seniors; open to other students upon arrangement; prerequisite, Course 4 or equivalent; 3 hours. Credit, 3. Dr. CANCE.

7. Specific Problems in Agricultural Economics. — An advanced course for students desirous of studying more intensively some of the problems immediately affecting the welfare of the farmer and society. Some of the problems that may be studied are: land problems; land tenure; size of farms; causes affecting land values; private property in land; taxation and inheritance; special problems; marketing and manufacturing farm products; co-operative enterprises and farmers' societies; cost of production; farm labor in New England; immigration; shifting of the rural population. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest. Seniors; open upon arrangement to other students; enrollment subject to approval of instructor; 2 hours a week. Credit, 2. Dr. Cance.

9. Seminar. — Research in agriculture: New England agriculture to 1860. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged. Credit, 1. Dr. Cance.

10. Seminar. — As stated in Course 9. Dr. Cance.

Rural Sociology.

12. The Rural Community. — There are two general divisions of the subject. There is, first, a study of the social status of the rural population, including the significance of the movement to the cities, the present social conditions of farm people, the social effects of rural life, and the social aspect of various agricultural questions of a technical or economic character. In the second part of the study will be discussed the various social agencies in rural progress, such as means of communication, farmers' organizations, rural schools, means of agricultural education, rural religious institutions and the federation of rural social agencies. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3. President Butterfield.

Rural Law.

14. Rural Law. — This course treats of the laws relating to business, especially business associated with rural affairs, and of those relating to citizenship, domestic relations, farming contracts, riparian rights, real estate and conveyancing. Lectures; practical work such as may fit one to perform the duties of a justice of the peace. Seniors; 1 hour. Credit, 1. Mr. Lyman.

Department of Veterinary Science.

Professor PAIGE.

[The courses in veterinary science have been arranged to meet the needs of students who purpose following practical agriculture, and of prospective students of human and comparative medicine.]

Elective Courses.

1. INTRODUCTORY BACTERIOLOGY. — The object of this course is to acquaint the student with the various organisms found in air, water, soil, milk and the body, and with the relation of these organisms to such processes as decomposition, fermentation and digestion, and to the production of disease. Toxic substances resulting from the growth of organisms, and the antitoxins used to counteract their action, are considered. Lectures, recitations and laboratory work. Seniors; three 2-hour laboratory exercises. Credit, 3. Professor PAIGE.

3. VETERINARY SCIENCE. — A course treating of veterinary hygiene, comparative anatomy and general pathology; veterinary materia medica and therapeutics; the theory and practice of veterinary medicine; general, special and operative surgery; and veterinary bacteriology and parasitology. Lectures, clinics, demonstrations and laboratory exercises. Must be followed by Course 4. Seniors; 5 hours. Credit, 5. Professor PAIGE.

4. VETERINARY SCIENCE. — As stated under Course 3.
Professor PAIGE.

Department of Zoölogy and Geology.

ZOÖLOGY.

Required Course.

1. ELEMENTARY ZOÖLOGY. — This forms the zoölogical part of an introductory course in biology. Laboratory dissection and lectures; laboratory text, Drew's "Invertebrate Zoölogy." Sophomores; two 2-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

Elective Courses.

3. INVERTEBRATE ZOÖLOGY. — This course does not include the insects. Economic zoölogy. Text-books, Parker & Haswell's "Textbook of Zoölogy," Vol. I., and Drew's "Invertebrate

Zoölogy." Prerequisite, Course 1 or its equivalent. Must be followed by Course 3. Juniors; two 2-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

4. VERTEBRATE ZOÖLOGY. — Text-book, Parker & Haswell's "Textbook of Zoölogy," Vol. II. Prerequisite, Course 3. Juniors; two 2-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

5, 6 and 7. ADVANCED ZOÖLOGY. — See Graduate School.

GEOLOGY.

Elective Courses.

2. GENERAL GEOLOGY. — Rock-forming minerals; rock types; dynamical, structural and surface geology. Lectures, map and field work. Sophomores; one 2-hour laboratory period and 2 lecture periods. Credit, 3. Assistant Professor GORDON.

THE GRADUATE SCHOOL.

THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., President of the College.
CHARLES H. FERNALD, Ph.D., Director of the Graduate School and Professor of Zoölogy.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years. Demands for these courses have now greatly increased, and in recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station agriculturists, bacteriologists, botanists, chemists, entomologists, horticulturists and zoölogists; and for numerous other positions requiring a great degree of skill and scientific knowledge.

ADMISSION.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the professor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for admission to the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, — together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

NATURE AND METHODS OF GRADUATE WORK.

Persons taking graduate work will find this quite different in its nature from undergraduate courses. A broad knowledge of two (or three) subjects is required, and the professors in charge of these may adopt any methods which may seem desirable to secure this to the student. Lectures, laboratory and field work in various forms are utilized; but whatever the method chosen, the aim is to train the students in methods of original investigation and experiment, inductive reasoning and the ability to carry on independent research. In addition to the lectures, a large amount of outside reading is required, the object being to give a broad knowledge of all aspects of the subjects chosen, in addition to the complete knowledge of those portions involved in or directly related to the original investigation which is to result in the thesis. Originality and ability to lead in scientific research after completing graduate work, and the establishment of a broad and thorough foundation upon which these qualities must be based, are the objects aimed at; and any methods which promise to give these results may be made use of (varying according to the nature and personal equation of each student), the supervision being largely individual rather than collective.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as the major and the other as the minor. These subjects may not be selected in the same department.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major, the others as minors. No two of these subjects may be taken in the same department.

Advanced students who are not candidates for degrees may, with the approval of the faculty of the school, take more than one subject in the same department.

A statement of the subjects chosen must in each case be submitted to the director of the school for approval by the necessary committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

A description of the equipment of the various departments is given under "General Information."

THESES.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject, must show that its writer possesses the ability to carry on original research, and must be an actual contribution to knowledge.

The thesis in its final form, ready for the printer, must be submitted to the director of the school for examination by the committee on the graduate school before the candidate for the doctor's degree may take the required oral examination. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in the thesis.

All theses become the property of the department in which they are prepared. When they are printed, five copies of each thesis must be deposited with the department.

FINAL EXAMINATIONS.

For the degree of master of science, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degree of doctor of philosophy, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

DEGREES CONFERRED.

The degree of master of science is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.

2. The devotion of twenty hours each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The degree of doctor of philosophy is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

2. The devotion of twenty hours each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science is $10, and for the degree of doctor of philosophy, $25.

Courses for Degree of Master of Science.

Available either as major or minor subjects for the degree of master of science: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Mathematics and physics.
Veterinary science.

Courses for the Degree of Doctor of Philosophy.

Available for a major subject for the degree of doctor of philosophy: —

Botany.
Chemistry.
Entomology.
Horticulture.

Available for a minor subject for the degree of doctor of philosophy: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Zoölogy.

GENERAL OUTLINE OF COURSES FOR THE DOCTORATE.

(*a*) *Major Courses.*

BOTANY: — The following subjects in botany may be studied: —

(*a*) Vegetable physiology.
(*b*) Vegetable pathology.
(*c*) Mycology.
(*d*) Ecology.
(*e*) Taxonomy.
(*f*) Phylogeny.
(*g*) History of botany.
(*h*) History and theory of evolution.

These subjects are pursued, to a greater or less extent, as the previous training of the student and the nature of the original problem undertaken may determine. The object of the course is to give the student a technical training in botany, to develop the spirit of research and to lay a broad foundation in the subject. (As a supplement to this course the student will do well to take, in addition to his prescribed minor work, a brief course in the history of philosophy and psychology.) Extensive reading of botanical literature, both general and specific, is required in certain subjects, and occasional lectures are given. A botanical conference is held monthly, in which various new problems of botanical science are considered by graduate students and the seniors who elect botany. A thesis dealing with some economic problem in plant physiology or pathology, or in both, and containing a distinct contribution to knowledge, is required.

CHEMISTRY. — The following subjects in chemistry may be studied: —

(*a*) Inorganic analysis, qualitative (of the rarer elements) and quantitative.
(*b*) Crystallography.
(*c*) Physical chemistry.
(*d*) Descriptive and determinative mineralogy.
(*e*) Chemical geology.
(*f*) Soil formation.
(*g*) Soil physics and chemistry; gas analysis; synthetic inorganic work.
(*h*) Chemical theory and history.
(*i*) General organic chemistry.
(*j*) Special topics in organic chemistry.

(*k*) Elementary quantitative organic analysis.

(*l*) Proximate qualitative and quantitative organic analysis, including determination of organic radicles.

(*m*) Organic synthesis of aliphatic and aromatic compounds.

(*n*) Problems in chemical manufacture.

(*o*) Recent chemistry of plant nutrition.

(*p*) Animal physiological and pathological chemistry, including the chemistry of foods, of milk and milk industries, of urine, urinalysis, and the standards for feeding of all kinds.

(*q*) Toxicology.

(*r*) Insecticides and fungicides.

Frequent examinations on current chemical literature are given. Early in the course original work on some chemical subject pertaining to agriculture must be begun. The history and results of this work must, before the awarding of the degree, be submitted in the form of a thesis containing a distinct contribution to knowledge.

ENTOMOLOGY. — I. For the degree of doctor of philosophy as a major: Some knowledge of all the divisions of this subject is essential for the professional entomologist, though a large part of his time will be devoted only to certain portions. To insure some familiarity with all these divisions, lectures, laboratory work, field training or required reading are given in each of the following topics: —

(*a*) *Morphology.* — Embryology; life history and transformations; histology; phylogeny and the relation of insects to other arthropods; hermaphroditism; hybrids; parthenogenesis; pedogenesis, heterogamy; chemistry of colors of insects; luminosity; deformities of insects; variation; duration of life.

(*b*) *Ecology.* — Dimorphism; polymorphism; warning coloration; mimicry; insect architecture; fertilization of plants by insects; instincts of insects; insect products of value to man; geographical distribution in the different faunal regions; methods of distribution; insect migration; geological history of insects; insects as disseminators of disease; enemies of insects, vegetable and animal, including parasites.

(*c*) *Economic Entomology.* — General principles; insecticides; apparatus; special cases; photography of insects and their work; methods of drawing for illustrations; field work on insects and study of life histories; legislation concerning insects.

(*d*) *Systematic Entomology.* — History of entomology, including classifications and the principles of classification; laws governing nomenclature; literature, how to find and use it; indexing literature; number of insects in collections and in existence (estimated); lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections of insects.

(*e*) *Seminar.* — A monthly meeting of graduates, at which reports on current literature are presented and various entomological topics of importance are discussed.

(*f*) *Required Readings.* — The best articles on the various topics named above and on the different orders of insects, to cover from fifteen thousand to twenty thousand pages of English, French and German, the candidate to be examined at the close of his course on this with his other work.

(*g*) *Thesis.* — A thesis, illustrated with drawings, consisting of the results of original investigation upon one or several topics, and constituting a distinct contribution to knowledge, must be completed before the final examinations are taken.

II. For the degree of doctor of philosophy as a minor, and for the degree of master of science either as a major or minor: Such portions of the course outlined above as seem most appropriate to their other subjects are given to students taking entomology under these conditions.

HORTICULTURE. — The work in horticulture necessarily varies considerably with different candidates, since its most important features are specialization, original investigation and the development of individual initiative in dealing with new questions. Each candidate must select some special field of horticultural study, and devote himself to it continuously. He will be required to attend lectures, conferences and seminars dealing with horticulture in its broader aspects, and to do advanced work in the following subjects: —

(*a*) Systematic pomology.
(*b*) Pomological practice.
(*c*) Commercial pomology.
(*d*) Systematic, practical and commercial olericulture.
(*e*) Greenhouse plants and problems.
(*f*) Floriculture.
(*g*) Landscape gardening.
(*h*) Plant breeding and general evolution.
(*i*) Questions of physiology connected with propagation and pruning.

Other requirements and opportunities are (1) periodical seminars, with special lectures by prominent men from outside the college; (2) extensive and systematically planned readings; (3) frequent visits, always with definite purpose, to orchards, gardens, greenhouses, estates and libraries outside the college grounds; and (4) the preparation and publication of a thesis which shall set forth the results of the candidate's major study, and be an original and positive contribution to horticultural knowledge.

(*b*) *Minor Courses.*

ZOÖLOGY. — The courses in zoölogy are offered as a minor course to candidates for the degree of doctor of philosophy. They constitute an intensive course designed to give a broad outlook and to meet the needs of the specialist, and call for original investigation, laboratory dissection, technique and museum work. The subjects treated and the work done will vary according to circumstances, but may be outlined thus: —

(*a*) General and comparative anatomy, both gross and microscopic; ontogeny and phylogeny; life cycles, metamorphosis and metagenesis; animal associations, colonial, commensal and parasitic, and symbiotic associations of animals and plants; adaptation, adaptive radiation and parallelisms.

(*b*) Geologic, geographic and bathymetric distribution of animals.

(*c*) Systematic zoölogy, including paleozoölogy; museum and field technique.

(*d*) Economic zoölogy.

(*e*) History and development of zoölogical science.

(*f*) Weekly seminar and journal club meetings, in which all advanced students of zoölogy take an active part.

(*g*) Collateral reading; general knowledge of current zoölogical literature.

OTHER SUBJECTS. — Courses in the other subjects open to choice as minors will be outlined according to the qualification and needs of the students applying for them.

SHORT COURSES.

SHORT COURSES.

SUMMER SCHOOL.

Purposes and Methods.

The summer school of the Massachusetts Agricultural College was organized in 1907, under an act of the Legislature authorizing a normal department at the college. The main purpose has from the first been to train teachers in elementary agriculture and nature study, so that these subjects may be effectively presented in the schools. The work, however, was considerably broadened in 1908, there being two principal innovations: (*a*) the addition of a considerable number of technical courses in agriculture and horticulture, without special reference to the needs of teachers; and (*b*) the addition of courses in rural sociology and economics for the special benefit of country clergymen. Some further extension of the work may be expected in 1909. Most of the instruction is given outdoors in demonstration, practicums and observation exercises. Instructors are chosen from the faculty of the Massachusetts Agricultural College and elsewhere.

Faculty (1908).

KENYON L. BUTTERFIELD, President of the college.
Prof. FRANK A. WAUGH, Dean of the summer school; School Gardening.
Asst.-Prof. EDWARD A. WHITE, Floriculture and Arboriculture.
Prof. G. E. STONE, Plant Physiology.
Asst.-Prof. A. VINCENT OSMUN, Plant Life.
Prof. W. D. HURD (University of Maine), Field Crops and Agricultural Industry.
Prof. T. N. CARVER (Harvard University), Agricultural Economics.
Prof. H. T. FERNALD, Insect Life.
Prof. J. A. FOORD, Soils and Tillage.
Mr. R. L. GRIBBEN, Domestic Animals.
Prof. W. R. HART, Agricultural Pedagogy.
Mr. F. B. JENKS, High School Agriculture.
Prin. A. C. MONAHAN (Turners Falls High School), High School Chemistry.
Mr. H. F. TOMPSON, Practical Gardening.
Prof. W. H. DUDLEY (Wisconsin Normal School), Bird Life.
Mr. F. M. GRACEY, Drawing.

Courses of Study.[1]

1. AGRICULTURAL PEDAGOGY. — Pedagogy with reference to its vocational aspects; the growth and function of professional and technical schools, with suggestions of the meaning of agriculture in modern education. Part of the course bears directly upon the materials and methods of teaching agriculture in the elementary grades. Five exercises weekly for first four weeks.

Professor HART.

2. HIGH SCHOOL AGRICULTURE. — The organization of high schools for the teaching of agriculture; equipment, courses of study, etc. A major portion of the course will be devoted to actual exercises, largely practicums, suitable for use in high schools. Five exercises weekly for first four weeks. Mr. JENKS.

3. HIGH SCHOOL CHEMISTRY. — Courses of study and equipment for general high school chemistry, with special reference to agriculture and the industries, with a considerable number of practical exercises designed to show how agricultural and industrial matters may be introduced into high school courses with advantage. Five exercises weekly for first four weeks.

Mr. MONAHAN.

4. SOILS AND TILLAGE. — The chemical, physical and biological composition of the soil, and the relation of each to plant growth; the formation of soils; natural and artificial sources of fertility; the methods and implements of tillage: the whole forming an introduction to modern scientific agriculture. Five exercises weekly for the first two weeks. Should be followed by Course 5.

Professor FOORD.

5. FIELD CROPS. — Class room, laboratory and field exercises designed to show modern methods of managing the principal field crops of New England, such as the grasses, the clovers, corn, potatoes, etc. Five exercises weekly for second two weeks. Should be preceded by Course 4. Professor HURD.

6. DOMESTIC ANIMALS. — The different breeds of horses, cattle, swine, etc.; modern methods of care, sanitation, breeding and feed-

---

[1] Some extension and change of the work as here outlined will be made in 1909. A revised outline will be sent upon application.

ing. This course will be especially adapted to those who have an amateur interest in live stock, but many of the exercises can be used in the hands of skilful teachers for regular school work. Five exercises weekly for four weeks. Mr. GRIBBEN.

7. PRACTICAL GARDENING. — Practical field exercises in planting, training, cultivation, etc. No special effort will be made to put the work into common school form, but the exercises will be specially valuable to school-garden teachers. Course limited to 20 pupils. Five exercises weekly, two hours each for first four weeks.
Mr. TOMPSON.

8. GARDENING INVESTIGATIONS. — Especially designed to develop a new point of view with reference to agriculture and nature study. Each pupil will be put to work in the garden and left to her own resources. So far as possible, no information whatever will be given by the instructor, the endeavor being to answer a great variety of questions through the investigations of the pupils. Suited to advanced teachers. Course limited to 40 pupils. Five exercises weekly, two hours each, for four weeks.
Dean WAUGH.

9. TREES AND SHRUBS. — A practical course in arboriculture, covering native and exotic trees and shrubs, their identification, propagation and culture. The work will be largely given in the field. Three exercises weekly for four weeks.
Assistant Professor WHITE.

10. FLORICULTURE. — Hardy annual and perennial flowering plants and those cultivated in the house or under glass. Course limited to 15 pupils. Two exercises weekly for four weeks.
Assistant Professor WHITE.

11. PLANT LIFE. — Elements of morphology, structure and classification, with special reference to mushrooms and ferns. Five exercises weekly for two weeks, July 20–31.
Assistant Professor OSMUN.

12. ELEMENTARY PLANT PHYSIOLOGY. — Simple experiments in plant life with home-made apparatus. Five exercises weekly for first two weeks. Professor STONE.

13. Bird Life. — Given with special reference to the economic relations of birds and the study of nesting habits. Five exercises weekly for the first two weeks of the term.

Professor Dudley.

14. Insect Life. — Given with special reference to the school study of economic insects and modern methods of combating them. Five exercises weekly for the second two weeks of the course.

Professor Fernald.

15. Nature Study Drawing. — For teachers who wish to make greater use of drawing lessons in handling nature study subjects. Course limited to 40 pupils. Five exercises weekly for four weeks.

Mr. Gracey.

16. Forestry. — Forest species, forest composition, regeneration, management, exploitation, etc., with some attention to the economics of forestry, and with special reference to New England conditions. Lectures and field exercises, four exercises weekly for two weeks, August 3–14. Assistant Professor White.

17. The Agricultural Industry in New England. — An outline of the agricultural situation in New England and of the farmers' business problems. Five exercises weekly for last two weeks. Professor Hurd.

18. Agricultural Economics. — A survey of the industry of agriculture as a whole and its relation to other industries; national and world conditions in agriculture. Five times weekly for last two weeks. Professor Carver.

19. The Social Aspect of Agriculture. — Given with special reference to the relation of the country church to the rural problem. Five lectures a week for last two weeks.

President Butterfield.

Winter School.

Purposes and Methods.

The short winter courses are offered to meet the needs of those, both young and old, who wish to study principles and modern methods in agriculture, and who are unable to attend the four-year courses. The work begins the first Tuesday in January and continues for ten weeks. Students are required to elect courses to make not more than twenty nor less than twelve exercises each week. The arrangement of courses is such that students must follow certain definite lines of work. All elections and all deviations from the rule must be approved by the professor in charge of the winter school. The courses are open to both men and women. Applicants must be eighteen years of age and must furnish satisfactory evidence of good moral character. Attendance upon chapel and the weekly assembly is required. The usual fees are charged for apparatus and materials used in laboratories.

Courses of Instruction.

	Hours a Week.
Soil fertility,	3
Horticulture, market gardening and fruit growing,	3
Floriculture,	5
Forage crops,	2
Breeds of live stock and animal breeding,	3
Live-stock feeding and management,	2
Animal diseases and stable sanitation,	2
Farm dairying,	5
Dairy industry,	8
Dairy bacteriology,	2
Botany,	3
Entomology,	3
Dairy mechanics,	1
Farm bookkeeping,	1

Course in Bee Culture.

This course will be given, if applied for by at least six students, beginning the fourth Wednesday in May and continuing two weeks. Lectures by specialists will be included. It will include the work outlined in the following summary: —

	Total Hours.
The structure of bees, with special reference to their work, Prof. H. T. FERNALD.	3
Flowers and fruits in their relation to bees, Professor STONE.	5
Honey crops and how to grow them, Professor BROOKS.	5
Bees and bee-keepers' supplies, Professor PAIGE.	10
Work in the apiary, under the direction of an expert,	20

GENERAL INFORMATION.

General Information.

A. FINANCIAL AND ADMINISTRATIVE.

Student Expenses.

Tuition. — Tuition is free to citizens of the United States; but students who are citizens of Massachusetts should apply to the senator of the district in which they live for a free scholarship. Blank application forms may be obtained from the registrar. The tuition charged persons not citizens of the United States is $120 a year.

Dormitories and Board. — The college has dormitory accommodation for about 64 students. The rooms in the dormitories are occupied chiefly by the upper classmen, hence new students as a rule are obliged to room in private houses. The rooms in the college dormitories are unfurnished. They are arranged in suites of three, — one study room and two bed rooms. They are heated with steam and lighted with electricity. Students care for their rooms themselves. The rent for each person ranges from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1 to $2 a week for each occupant. In Draper Hall (the dining hall) rooms are provided for women students. The rental is $1.50 per week for each person. All correspondence in regard to rooms should be addressed to the dean of the college.

Board can be had at the college dining hall. Good board is furnished at cost. At present the price of board is $3.75 a week, but the college does not promise to keep the price at that figure; it may be more and it may be less.

Expenses.

The necessary college expenses per year are estimated as follows: —

Tuition: Citizens of Massachusetts free through State scholarships; other citizens of the United States free; foreigners, $120 a year.

	Low.	High.
Room in college dormitories or in private houses,	$39	$75
Board in college dining hall, $3.75 a week,	135	135
Laundry, 50 cents to 85 cents a week,	18	30
Military uniform, first year,	15	15
Laboratory fees,	2	20
Books, stationery and other miscellaneous,	16	50
	$225	$325

OTHER EXPENSES. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial demands made upon students which they should expect to meet. Chief among these are class assessments, support for the Musical Association and the Y. M. C. A., and taxes levied for maintenance of various student organizations, such as the Social Union, Athletic Association, college "Signal" (paper), etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is assumed by students joining a fraternity. Students rooming in college dormitories are obliged to equip their rooms with furniture. Besides the amount necessary for clothes, the economical student will probably spend between $250 and $350 a year.

STUDENT AID.

SELF HELP. — A number of students find opportunities for earning money without depending on the labor fund, and many rely upon labor of some sort to earn their way through college. A few men have paid all their way through college; a great many more have paid a large part of their expenses; and many have earned a small proportion of the cost of their course. But the college recommends that no new student enter without having at least $150 with which to pay his way until he can establish himself at work. The college does not encourage students to enter without money in the expectation of earning their way. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in college, or, instead, to borrow money with which to complete his course. No student should undertake work that interferes with his studies, and students should remember that, owing to the large number of applications for labor-fund employment, no one man can receive a large amount from that source.

LABOR FUND. — An annual appropriation of $5,000 for student labor is received from the State. This fund is used only in assisting students who are citizens of Massachusetts and dependent entirely or in part on their own exertions. So far as possible such students will be employed in some department of the college. The Department of Agriculture and the Department of Horticulture usually afford the most work. Application for student labor should be made directly to the president. Applicants must present a certificate signed by parent or guardian and by one of the selectmen of the town in which they reside, showing that they need the aid. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor.

SPECIAL NOTICE TO NEEDY STUDENTS. — In the last year or two the demand for paid labor on the part of new students has exceeded the amount of employment that the college can offer. The college has, therefore, established a bureau through which it will attempt to find work for new students about the village and on adjacent farms. But it cannot promise work for any students, particularly freshmen. The college accordingly urges prospective students who are dependent upon their own efforts not to undertake the course before they have enough money to carry them through or nearly through the first year.

STUDENT ACCOUNTS.

The following rules are in force concerning student accounts: —

No student will be allowed to graduate until all bills due from him to the institution are paid.

College charges, such as room rent, laboratory fees, tuition, etc., must be paid strictly in advance at the beginning of each semester. No student will be allowed to register until such payments are made.

Every student boarding at Draper Hall shall pay at the beginning of each semester at least one month's board in advance; and no student shall be allowed to continue to board at Draper Hall if more than one month in arrears in his payments.

All money due for student labor shall be applied on account toward any bills that the student may owe to the institution.

LABORATORY FEES.

	Per Semester.
Botany: —	
Graduates,	$4 00
Senior year,	3 00
Junior year, first semester,	3 00
Junior year, second semester,	1 00
Sophomore year, second semester,	3 00
Chemistry: —	
Courses 4, 7, 8, each,	3 00
Courses 6, 11, 12, 14, 16, 18, each,	5 00
Deposit for breakage, etc., any course,	5 00
Entomology: —	
Seniors,	3 00
Landscape gardening: —	
Senior year,	4 00
Junior year,	2 50
Zoölogy: —	
Sophomore year,	2 00
Other years,	4 00

B. ACADEMIC AND DEPARTMENTAL.

DEGREES.

Those who complete the four-years course receive the degree of bachelor of science. Those who receive this degree may also, upon payment of a fee, receive the degree of bachelor of science (B.Sc.) from Boston University (see page 9); but the candidate must meet the conditions imposed by the university concerning preparatory studies. The fee for graduation from the college is $5; that for the degree of Boston University is $10.

Graduate students who complete the assigned courses will receive the degree of master of science (M.Sc.) (fee, $10). Credit may sometimes be allowed toward this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-years course of study and present a satisfactory thesis will be granted the degree of doctor of philosophy (fee, $25).

Those to whom degrees are awarded must present themselves in person at commencement to receive them. Honorary degrees are not conferred.

Scholarships and Prizes.

Scholarships.

The income of gifts from different persons is distributed in scholarships to worthy students requiring aid. The funds supporting these scholarships are: —

1. The Mary Robinson fund of $1,000, the bequest of Miss Mary Robinson of Medfield.

2. The Whiting Street fund of $1,000, the bequest of Whiting Street of Northampton.

3. The Henry Gassett fund of $1,000, the bequest of Henry Gassett of North Weymouth.

Prizes.

Prizes are given annually in several departments for excellence in study or for special achievement. The prizes offered for 1909 are: —

Agriculture. — The Grinnell prizes (first, second and third), given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. They are $25, $15 and $10.

Botany. — The Hills prizes (amounting to $35), given by Henry F. Hills of Amherst, will be awarded to members of the senior class as follows: for the best herbarium, $15; for the best collection of Massachusetts trees and shrubs, $10; for the best collection of Massachusetts woods, $10. No collection deemed unworthy of a prize will be considered. In 1909, a prize of $5 is offered to that member of the freshman class who presents the best herbarium of native flowering plants.

English. — The Flint prizes (first, $30; second, $20) are awarded under certain restrictions to those members of the junior class delivering the best and the second best oration. Both composition and delivery are considered.

The Burnham prizes in English, given by the late T. O. H. P. Burnham of Boston, are awarded as follows: To freshmen, for excellence in declamation, two prizes: first, $25; second, $20. The speakers are chosen through a series of competitions.

Entomology. — Professional entomologists among the alumni of the college offer two prizes for the best work done in entomology by undergraduates. The prizes ($20 and $10) are awarded by the

Department of Entomology according to a scale of points announced in advance.

Forestry. — The J. W. D. French prize ($25) is given by the Bay State Agricultural Society to that member of the senior class who writes the best essay on forestry.

General Improvement. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who during his first two years in college has shown the greatest improvement in scholarship, character, and example.

Winter Course Prizes for 1909.

1. Given by the Bowker Fertilizer Company, Boston, to the student who is most familiar with the nature and composition of fertilizers and their use, one-half ton Stockbridge fertilizer.
2. Given by the German Kali Works, New York City, for the best essay on the use of fertilizers with particular reference to the use of potash, one ton of kainit or its value in gold.

Military Diplomas.

Military diplomas are given to those men receiving the degree of bachelor of science who by their work in the Department of Military Science have shown themselves worthy of distinction. These diplomas recommend those receiving them for commissions in the United States army or the militia of the several States.

EQUIPMENT.

Agronomy. — The work in agronomy is carried on by means of lectures, laboratory work and field work. The laboratories are in the north wing of South College. The seed laboratory is equipped with samples of the different grains and seeds of economic importance in field culture, and with apparatus for the study and testing of these seeds, including microscopes and the apparatus necessary for viability and purity tests. The soil laboratory is well equipped with apparatus for the study of the physical properties of soils, including an electric centrifuge; an electric resistance thermometer for determining soil and other temperatures; evaporimeters and drying ovens; and good balances. For the work in drainage there is available a good surveyor's transit, a wye level and two drainage levels, rods, steel tapes, surveyors' pins, and a set of drainage tools. The college farm may also be considered a part of the agronomy laboratory.

Animal Husbandry. — An important part of the equipment for laboratory work in animal husbandry is the live stock of the college farm, which includes pure-bred and grade Ayrshire, Guernsey, Holstein and Jersey cattle, French coach, Percheron and Clydesdale horses, and Berkshire and Yorkshire swine. A set of plaster-of-paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different food stuffs available for the use of the New England farmer, are included in the equipment for this work.

Botany. — The department of botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for sophomore and junior work, and one for senior work; and three rooms specially fitted for graduate students. The experiment station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with all necessary conveniences. The basement contains a bacteriological laboratory, a seed and soil room; and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe, and other tools and appliances. In the senior laboratory is a room designed especially for physiological work; this laboratory is well supplied also with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc. The herbarium contains 15,000 species of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and about 12,000 sheets of fungi. The laboratory is equipped with 85 modern compound microscopes and a number of dissecting microscopes, microtomes and a large series of charts. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experiment work and for housing material often needed in the laboratory.

Chemistry. — The department of chemistry has rooms adapted to chemical uses, supplied with a large assortment of apparatus and chemical materials. The lecture room on the second floor seats 70 students. Immediately adjoining it are four smaller rooms for apparatus and the preparation of materials for the lecture table. The laboratory for beginners is furnished with 40 working-tables. Each table is provided with reagents and apparatus for independent work. A well-equipped laboratory for advanced work is also provided. The weighing room has 6 balances and improved apparatus for determining densities of solids, liquids and gases. The equipment includes also a microscope, a spectroscope, a polariscope, a photometer, a barometer, numerous models, and an extensive collection of industrial charts, and there is a valuable and growing collection of specimens and samples. The latter includes rocks, minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products, and artificial preparations of mineral and organic compounds. With this should also be mentioned a series of preparations used for illustrating the various stages of different manufactures, from raw material to finished product.

DAIRYING. — Two large, well-drained, cement-floored rooms in the South College are used for dairy work. These are equipped with a milk heater, separators, coolers and aërators, a pasteurizer, ripening vats, churns, butter workers, a mechanical can washer, a sterilizer, and other small apparatus necessary to a well-equipped dairy or butter factory. A third room is equipped with hand and power Babcock milk-testing machines and other apparatus used for milk and butter testing. These rooms have individual lockers for students. The new sanitary dairy and stable give an opportunity for practical laboratory work in the production and handling of certified milk.

DINING HALL. — Draper Hall, a brick colonial building, equipped with the modern conveniences of a dining hall, was opened in 1903. It contains a number of suites of rooms reserved for women students. The dining service is under the supervision of the college.

DRAWING. — Two rooms on the second floor of Wilder Hall are occupied by the classes in drawing. They are equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details, and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

ENTOMOLOGY. — *Entomological Laboratory.* — The equipment for work in entomology for seniors and for graduate students is unusually good. The laboratory building contains a large room for laboratory work, provided with tables, dissecting and compound microscopes, microtomes, reagents and the usual laboratory implements. One part of the building is fitted up as a lecture room. Another part is devoted to library purposes, and contains a card catalogue of more than 50,000 cards, indexing the literature on insects. Besides the well-selected list of entomological works in this room, there are in the college library an unusual number of rare and valuable books on this subject. These libraries are supplemented by the private libraries of the professors in charge, which contain more than 25,000 volumes, many of which cannot be found elsewhere in the United States. In another room is a large and growing collection of insects, both in the adult and in the early stages. As the laboratory is associated with the insectary of the college experiment station, the facilities of the latter are directly available. The apparatus room of the insectary, with its samples of spray pumps, nozzles and other articles for the practical treatment of insects; the chemical room, fitted for the analysis of insecticides and for other chemico-entomological work; and a greenhouse where plants infected with injurious insects are under continual observation and experimental treatment, are all open to the student; and in addition are provided several private laboratory rooms and a photographing room with an unusually good equipment of cameras. The large greenhouses, grounds, gardens and orchards of the college provide further for study under natural conditions of a wide range of subjects relating to injurious insects.

FARM ADMINISTRATION. — The college farm of 190 acres is under the supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The work in this department includes the production of the common field crops, and the care and raising of the different classes of live stock mentioned under animal husbandry. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied.

FLORICULTURE. — The department of floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a department of floriculture better equipped than this. The legislative appropriation of 1908 has made possible the erection of a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of arboriculture.

GEOLOGY. — The teaching in geology is illustrated with a very complete series of minerals, the State collection of rocks of Massachusetts, a series of Ward's fossils and casts of fossils, and models and charts.

HEATING, LIGHTING AND POWER. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop.

LANDSCAPE GARDENING. — The work in landscape gardening is developed in a strong technical four-years course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for exacting work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

LIBRARY. — The library occupies the lower floor of the Library-Chapel building. It contains nearly 32,000 books. Among these. scientific treatises predominate, but history, economics and literature are well represented. Indeed, the library has grown so rapidly that additional room has become necessary. The reading room supplies good periodicals, both technical and non-technical; encyclopedias and general reference books; and a selected collection of works for general reading.

MARKET GARDENING. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and a laboratory particularly equipped for floriculture and market gardening. A good library of works on vegetable gardening is available.

MATHEMATICS, PHYSICS AND CIVIL ENGINEERING. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 2 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 2 wye levels, a dumpy level, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

Physics. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

Military Science. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, a recitation room, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

Physical Education. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The room used for exercise and recreation is equipped with modern developing apparatus and two hand-ball courts, and is large enough for basket ball. The apparatus can quickly be removed to clear the floor. An out-door board track enables students to secure track practice through the winter. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium is to be fitted with a model bathroom. The gymnasium is open from 9 A.M. to 10 P.M., and exercise may be taken at such hours as do not conflict with military drill or physical education classes. The regulation costume for class exercise consists of a white track suit and white, rubber-sole shoes.

Pomology. — The department of pomology has 10 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There is also a commercial vineyard and a smaller one; in these are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also extensive nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples and plums in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1908–09, for instance, apples for class use were received from British Columbia, Ontario, Quebec, Nova Scotia, Iowa, Wisconsin, Michigan, Connecticut, New York, Oklahoma, Kansas, Colorado, Oregon, New Jersey, and Vermont, besides collections of grapes from California and citrous fruits from Florida and Texas.

Veterinary Science and Bacteriology. — The department of veterinary science and bacteriology occupies a modern laboratory and hospital stable, both built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There are a lecture hall, a museum, a demonstration room, a photographing room and a work shop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in bacteriology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Zoölogy. — A large and well-lighted room in the South College is equipped as a zoölogical laboratory. It has the best apparatus, consisting of microscopes, both simple and compound, a microtome, a paraffin bath, an incubator, dissecting instruments and other necessary apparatus. A reference library which includes the current zoölogical and geological journals is kept in this room, and there are ample aquaria in which living aquatic forms may be studied.

The lecture room is a large room in South College. It is supplied with an electric projection lantern, a set of Leuckart charts, various special charts and a complete set of Auzoux models illustrative of human and comparative anatomy. A special set of topical specimens is used for class illustration, and the more extensive museum collection is drawn upon for the same purpose.

The museum is relied on mainly for specimens illustrating the forms treated of in the lecture and the laboratory courses. In addition to this, the aim has been to show as fully as possible the fauna of Massachusetts, and types that show especially the evolution and the relationship of the members of the animal kingdom. The collection consists of more than 11,000 specimens. The museum is open to the public on Saturdays from 1 to 5 P.M. and on other week days from 2.15 to 4.15 P.M. The curator is Assistant Professor Gordon.

COLLEGE ACTIVITIES.

Religious Services.

Chapel services are held four mornings a week. On Wednesday, instead of chapel an afternoon assembly is held, for which an attempt is made to secure speakers who will present important current subjects. Students are required to attend chapel and assembly.

The Young Men's Christian Association of the college holds a short religious meeting in the chapel on Thursday evenings, and conducts several Bible classes. For part of the year the college and the Y. M. C. A. unite in Sunday vespers, held in the chapel. At vespers a prominent clergyman or layman speaks.

Student Organizations.

A large number of student organizations furnish opportunity for work and leadership to students.

The Massachusetts Agricultural College Social Union has recently been established. All students become members by paying a small fee; the Union is designed to become the center of student interests. It has equipped in North College a trophy room and a large lounging room for music, games, reading and study; and in the fall and winter months it gives a series of entertainments, free to the students and faculty.

The Young Men's Christian Association is active both socially and religiously.

The College Senate is composed of representatives of the senior and junior classes. It serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The musical organizations include an orchestra, a glee club and a quartette. These furnish music for college meetings, and occasionally give concerts. A military band is maintained as part of the cadet corps.

The Athletic Association represents in the college the interests of the football, baseball, basketball, track, hockey and tennis teams.

Among the other clubs are the Mettewampe Club, organized for walking and other outdoor recreation, and a debating club.

The college publications are the "Signal," published bi-weekly by the student body, and the "Index," published annually by the junior class.

Clubs, Conferences and Seminars.

The College Chemical Club is designed to bring the students of chemistry into closer relationship. Original papers are often read by the members, seminars are held, and outside speakers are invited to address the club and to discuss with the members general topics pertaining to chemistry.

The Stockbridge Club is an organization of students specially interested in practical agriculture, horticulture and floriculture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

The English Conference, meeting once a month or oftener, is composed of the instructors in the department of English and the students who are enrolled in elective English.

A seminar for juniors and seniors is conducted by the division of agriculture. The division of horticulture likewise conducts conferences or seminars.

An entomological club and a zoölogical club are also maintained by those specially interested in these departments of college work.

HONORS AND AWARDS — 1908.

Prize Awards.

THE GRINNELL AGRICULTURAL PRIZE. — To those members of the senior class who produce the best and second best examinations, oral and written, in theoretical agriculture. First prize, $40, to John Daniel; second prize, $20, to Clifford Dolan.

J. W. D. French Prize in Arboriculture. — To the writer of the best essay on the street trees of Amherst. One prize, $25, to Charles S. Putnam.

Hills Botanical Prizes. — For the best general herbarium, $15, to Laruentsius D. Larsen. For the best collection of Massachusetts trees and shrubs, $10, to Stearnes L. Davenport. For the best collection of Massachusetts woods, $10, to Winthrop A. Cummings.

Burnham Prizes in English. — To freshmen, for excellence in public declamation: first prize, $25, to Allyn P. Bursley; second prize, $20, to Herbert J. Baker; honorable mention, Herbert W. Blaney. To sophomores, for excellence in competitive essay writing: first prize, $20, no award; second prize, $10, to Henry T. Cowles; third prize, $5, to Samuel W. Mendum.

Flint Prizes in English. — To members of the junior class who produce the best and second best orations: first prize, $30, to Richard C. Potter; second prize, $20, to Charles H. White; honorable mention, Marcus T. Smulyan.

Entomological Prize. — Given by graduates of the college working in entomology to the two members of the senior class taking that subject who have most fully satisfied certain requirements of work indicated by the donors. First prize, $20, to Carlton C. Gowdey; second prize, $10, to James A. Hyslop.

The Western Alumni Association Prize. — To that member of the sophomore class who, during his two years in college, has shown the greatest improvement in scholarship, character and example. $25, to Frank T. Haynes.

Military Honors.

The following cadets, members of the senior class, were reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts as showing special aptitude for military service: John Albert Anderson, Chester Socrates Gillett, Kenneth Edward Gillett, Edwin Daniels Philbrick, William Franklin Turner, Roland Hale Verbeck, Hermon Temple Wheeler, Raymond Dean Whitmarsh, Samuel Judd Wright.

DEGREES CONFERRED AND ROLL OF STUDENTS.

DEGREES CONFERRED — 1908.

DOCTOR OF PHILOSOPHY.

Franklin, Henry James, Bernardston. B.S., Massachusetts Agricultural College, 1903.

MASTER OF SCIENCE.

Shaw, Jacob Kingsley, North Amherst. B.S., University of Vermont, 1899.

Total, 2.

BACHELOR OF SCIENCE (B.Sc.).

Allen, Charles Francis,	Worcester.
Alley, Harold Edward,	Gloucester.
Anderson, John Albert,	North Brookfield.
Anderson, Kenneth French,	Roslindale.
Bailey, Ernest Winfield,	Worcester.
Bangs, Bradley Wheelock,	Amherst.
Barry, Thomas Addis,	Amherst.
Bartholomew, Persis,	Melrose Highlands.
Bates, Carleton,	Salem.
Chapman, Lloyd Warren,	Pepperell.
Chase, Henry Clinton,	Swampscott.
Clark, Orton Loring,	Malden.
Cobb, George Robert,	Amherst.
Coleman, William John,	Natick.
Cummings, Winthrop Atherton,	Bondsville.
Cutting, Leroy Edward,	Amherst.
Daniel, John,	Osterville.
Davenport, Stearnes Lothrop,	North Grafton.
Davis, Paul Augustin,	Lowell.
Dolan, Clifford,	Hudson.
Eastman, Perley Monroe,	Townsend.
Edwards, Frank Laurence,	Somerville.
Farley, Arthur James,	Waltham.
Farrar, Parke Warren,	Springfield.
Flint, Clifton Leroy,	Amesbury.
Gillett, Chester Socrates,	Southwick.
Gillett, Kenneth Edward,	Southwick.
Gowdey, Carlton Craig,	*Bridgetown, Barbados.*
Hayes, Herbert Kendall,	*North Granby, Conn.*

Howe, William Llewellyn,	Marlborough.
Hutchings, Frank Farley,	Amherst.
Hyslop, James Augustus,	*Rutherford, N. J.*
Jackson, Raymond Hobart,	Amherst.
Jennison, Harry Milliken,	Millbury.
Johnson, Frederick Andrew,	Westford.
Jones, Thomas Henry,	Easton.
Larned, Adelbert Joseph,	Amherst.
Larsen, Lars David,	*Bridgeport, Conn.*
Liang, Lai-Kwei,	*Tientsin, China.*
Miller, Danforth Parker,	Worcester.
Paige, George,	Amherst.
Parker, John Robert,	*Poquonock, Conn.*
Philbrick, Edwin Daniels,	Somerville.
Reed, Horace Bigelow,	Worcester.
Regan, William Swift,	Northampton.
Sawyer, William Francis,	Sterling.
Shattuck, Leroy Altus,	Pepperell.
Thurston, Frank Eugene,	Worcester.
Turner, Olive May,	Amherst.
Turner, William Franklin,	Reading.
Verbeck, Roland Hale,	Malden.
Warner, Theoren Levi,	Sunderland.
Waugh, Thomas Francis,	Worcester.
Wellington, Joseph Worcester,	Waltham.
Wheeler, Hermon Temple,	Lincoln.
Whiting, Albert Lemuel,	Stoughton.
Whitmarsh, Raymond Dean,	Amherst.
Wright, Samuel Judd,	South Sudbury.

Total, 58.

ROLL OF STUDENTS.

GRADUATE STUDENTS. — CANDIDATES FOR A DEGREE.

Bouquet, Arthur George Bristol, B.S., Oregon Agricultural College, 1906.	*Purley, Eng.,*	9 Fearing Street.
Bourne, Arthur Israel, A.B., Dartmouth College, 1907.	*Kensington, N. H.,*	82 Pleasant Street.
Burrell, Orange Bennett, B.S., Michigan Agricultural College, 1905.	*South Haven, Mich.,*	– –
Chapman, George Henry, B.Sc., Massachusetts Agricultural College, 1907.	*Wallingford, Conn.,*	15 Amity Street.
Davis, Irving Gilman, A.B., Bates College, 1906.	*Auburn, Me.,*	24 North College.
Holland, Edward Bertram, M.Sc., Massachusetts Agricultural College, 1898.	Amherst,	28 North Prospect Street.
Hooker, Charles Worcester, A.B., Amherst College, 1906.	Amherst,	5 North East Street.
Jennison, Harry Milliken, B.Sc., Massachusetts Agricultural College, 1908.	Auburn,	66 Pleasant Street.
Johnson, Frederick Andrew, B.Sc., Massachusetts Agricultural College, 1908.	Graniteville,	84 Pleasant Street.
Regan, William Swift, B.Sc., Massachusetts Agricultural College, 1908.	Northampton,	84 Pleasant Street.
Smith, Philip Henry, B.Sc., Massachusetts Agricultural College, 1897.	Amherst,	102 Main Street
Summers, John Nicholas, B.Sc., Massachusetts Agricultural College, 1907.	Campello,	Insectary.
Thurston, Frank Eugene, B.Sc., Massachusetts Agricultural College, 1908.	Worcester,	66 Pleasant Street.
Whitmarsh, Raymond Dean, B.Sc., Massachusetts Agricultural College, 1908.	Amherst,	120 Pleasant Street.

Total, 14.

SPECIAL STUDENTS. — NOT CANDIDATES FOR A DEGREE.

Nagai, Isaburo,	*Tokyo, Japan,*	120 Pleasant Street.

Total, 1.

SENIOR CLASS.

Alger, Paul Edgar,	Reading,	Brooks Farm.
Barlow, Waldo Darius,[1]	Amherst,	7 Northampton Road.
Barnes, Benjamin Franklin, Jr.,	Haverhill,	Theta Phi House.
Bartlett, Oscar Christopher,	Westhampton,	Mr. Goldberg's.
Briggs, Orwell Burlton,[1]	Egremont,	82 Pleasant Street.
Brown, George Murray, Jr.,	Cambridge,	4 South College.
Caffrey, Donald John,[1]	Gardner,	West Experiment Station.
Cardin, Patricio Pennaradonda,	*Artemesia, Cuba,*	7 South College.
Chase, Edward Irving,[1]	Somerville,	30 North Prospect Street.
Codding, George Melvin,	Taunton,	17 South College.
Corbett, Lamert Seymour,	Jamaica Plain,	6 South College.
Crosby, Harold Parsons,	Lenox,	12 South College.
Crossman, Samuel Sutton,	Needham,	11 South College.

---

[1] Work incomplete.

Curran, David Aloysius,	Marlborough,	North Pleasant Street.
Cutler, Homer,	Westborough,	West Experiment Station.
Fulton, Gordon Russell,[1]	Lynn,	West Experiment Station.
Geer, Myron Francis,	Springfield,	44 Pleasant Street.
Geer, Wayne Emory,[1]	Springfield,	44 Pleasant Street.
Hathaway, Elmer Francis,	Cambridge,	Kappa Sigma House
Hsieh, En-Lung,	*Tientsin, China,*	6 Maple Street.
Hubbard, Arthur Ward,	Sunderland,	5 South College.
Ide, Warren Leroy,	Dudley,	9 North College.
Ingalls, Dorsey Fisher,	Cheshire,	5 South College.
Jen, Huan,	*Tientsin, China,*	31 East Pleasant Street.
Knight, Harry Orrison,	Gardner,	96 Pleasant Street.
Lindblad, Rockwood Chester,	North Grafton,	20 South College.
Lull, Robert Delano,[1]	*Windsor, Vt.,*	– –
MacGown, Guy Ernestus,	*South Britain, Conn.,*	West Experiment Station.
Monahan, James Valentine,	South Framingham,	East Pleasant Street.
Neale, Harold Johnson,	Worcester,	9 South College.
Noble, Harold Gordon,	Springfield,	20 South College.
Noyes, John,	Roslindale,	Wilder Hall.
O'Grady, James Raphael,	Holliston,	8 South College.
Oliver, John Thomas,	Dorchester,	14 Kellogg Avenue.
Phelps, Harold Dwight,	West Springfield,	Plant House.
Potter, Richard Chute,	Concord,	11 South College.
Putnam, Charles Sumner,	Princeton,	13 East Pleasant Street.
Sexton, George Francis,	Worcester,	Walker's House.
Smulyan, Marcus Thomas,	*New York, N. Y.,*	West Experiment Station.
Thompson, Myron Wood,	Halifax,	18 South College.
Thomson, Jared Brewer,	Monterey,	25 North College.
Turner, Henry William,[1]	*Trinidad, Cuba,*	9 South College.
Warner, Frederick Chester,	Sunderland,	6 South College.
Waters, Theodore Charles,	*Rocky Hill, Conn.,*	French Hall.
Webb, Charles Russell,	Worcester,	10 South College.
Whaley, James Sidney,	*East Orange, N. J.,*	12 East Pleasant Street.
White, Charles Howard,[1]	*Providence, R. I.,*	4 South College.
White, Herbert Linwood,	*Evansville, Ind.,*	Cutler's House.
Willis, Luther George,[1]	Melrose Highlands,	Mr. Walsh's.
Wilson, Frank Herbert, Jr.,	Nahant,	12 South College

Total, 50.

JUNIOR CLASS.

Allen, Rodolphus Harold,[1]	Fall River	Kappa Sigma House.
Annis, Ross Evered,[1]	Natick,	116 Pleasant Street.
Armstrong, Robert Pierson,[1]	*Rutherford, N. J.,*	26 North College.
Bailey, Dexter Edward,	Tewksbury,	88 Pleasant Street.
Bailey, Justus Conant,	Wareham,	88 Pleasant Street.
Beeman, Francis Stone,	Amherst,	86 Main Street.
Blaney, Jonathan Phillips,[1]	Swampscott,	22 North College.
Brandt, Louis,	Everett,	Clark Hall.
Brooks, Henry Alvan,	*Cleveland, O.,*	16 South College.
Brooks, Sumner Cushing,	Amherst,	Plant House Ground.
Brown, Louis Carmel,	Bridgewater,	28 North College.
Burke, Edward Joseph,[1]	Holyoke,	9 South College.
Clarke, Walter Roe,	*Milton-on-Hudson, N. Y.,*	1 South College.
Cloues, William Arthur,[1]	*Warner, N. H.,*	7 South College.
Cowles, Henry Trask,	Worcester,	88 Pleasant Street.
Damon, Edward Farnham,[1]	Concord Junction,	18 South College.
Dickinson, Lawrence S.,	Amherst,	Plant House Grounds.
Eddy, Roger Sherman,	Dorchester,	116 Pleasant Street.
Everson, John Nelson,	Hanover,	2 South College.
Fisk, Raymond John,	Stoneham,	88 Pleasant Street.
Folsom, Josiah Chase,	Billerica,	College Store.
Francis, Henry Russell,[1]	Dennisport,	10 North College.

---

[1] Work incomplete.

French, Horace Wells,	*Pawtucket, R. I.,*	15 South College.
Haynes, Frank Tuttle,	Sturbridge,	28 North College.
Hazen, Myron Smith,	Springfield,	Veterinary Laboratory.
Holland, Arthur Witt,	Shrewsbury,	24 North College.
Hosmer, Charles Irwin,	Turners Falls,	8 South College.
Johnson, William Clarence,	South Framingham,	10 North College.
Leonard, William Edward,[1]	Belmont,	22 North College.
McLaine, Leonard Septimus,	*New York, N. Y.,*	1 South College.
Mendum, Samuel Weis,	Roxbury,	88 Pleasant Street.
Nickless, Fred Parker,[1]	Billerica,	College Store.
Oertel, Charles Andrew,	South Hadley Falls,	South Hadley Falls.
Partridge, Frank Herbert,	Cambridge,	Clark Hall.
Paulsen, George,[1]	*New York, N. Y.,*	2 South College.
Prouty, Frank Alvin,[1]	Worcester,	Snell Street.
Rockwood, Albert Fletcher,[1]	Concord,	17 South College.
Roy, Goldie Calista,[1]	Watertown,	97 Pleasant Street.
Schermerhorn, Lyman Gibbs,[1]	*Kingston, R. I.,*	5 North College.
Shamiæ, George Mansour,	*Damascus, Syria,*	Old Creamery.
Thomas, Frank Lincoln,	Athol,	21 North College.
Titus, Willard McCready,[1]	New Braintree,	16 South College.
Turner, Edward Harrison,[1]	Reading,	Plant House.
Urban, Otto Velorous Taft,	Upton,	Kappa Sigma House.
Vinton, George Newton,[1]	Sturbridge,	Thompson House.
Waldron, Ralph Augustus,[1]	Hyde Park,	East Experiment Station.
Wallace, William Newton,[1]	Amherst,	6 Phillips Street.
	Total, 47.	

SOPHOMORE CLASS.

Adams, James Fowler,[1]	Melrose,	5 North College.
Allen, Park West,	Westfield,	14 South College.
Armstrong, Ralph Henry,[1]	Holyoke,	75 Pleasant Street.
Baker, Herbert Jonathan,	*Selbyville, Del.,*	Kappa Sigma House.
Barrows, Raymond Corbin,	*Stafford Springs, Conn.,*	E. H. Forristall.
Bean, Thomas Webster,	South Hadley Falls,	South Hadley Falls.
Bentley, Arnold Gordon,	Hyde Park,	3 McClellan Street.
Blaney, Herbert Wardwell,	Swampscott,	87 Pleasant Street.
Brown, Edgar Morton,	Springfield,	9 North College.
Brown, Irving Clarence,	Natick,	96 Pleasant Street.
Burnham, Arthur James,	Holyoke,	75 Pleasant Street.
Burseley, Allyn Parker,	West Barnstable,	88 Pleasant Street.
Conant, Arthur Theodore,	Sunderland,	Sunderland,
Damon, Charles Murray,	Haydenville,	Experiment Station.
Davis, Egbert Norton,	South Framingham,	77 Pleasant Street.
Davis, Irving Wilder,	Lowell,	Insectary.
Drury, Harold Blake,	Athol,	23 North College.
Dudley, John Edward,[1]	Newton Center,	21 North College.
Gilgore, Irvin Craig,	*Schenectady, N. Y.,*	3 McClellan Street.
Henry, Willard Francis,	Hopedale,	7 North College.
Hill, Nathaniel Herbert,	*Glenmoore, N. J.,*	14 South College.
Howe, Harold Hosmer,[1]	Springfield,	Kappa Sigma House.
Huang, Chen-Hua,	*Tientsin, China,*	75 Pleasant Street.
Jenks, Albert Roscoe,	Three Rivers,	Plant House.
Johnson, Leonard Matthews,	Easthampton,	27 North College.
Labouteley, Gaston Edward,	Lynn,	Kappa Sigma House.
Larrabee, Edward Arthur,	Winthrop,	Clark Hall.
Lodge, Charles Albert,[1]	Manchester,	87 Pleasant Street.
McLaughlin, Frederick Adams,[1]	Lee,	Kappa Sigma House.
McNayr, Rupert Stanley,	Rockland,	13 South College.
McGraw, Frank Dobson,	Fall River,	North College.
Morse, Henry Bowditch,	Salem,	Kappa Sigma House.
Nielsen, Gustaf Arnold,[1]	West Newton,	96 Pleasant Street.

---

[1] Work incomplete.

Nickerson, George Payne,	Amherst,	East Experiment Station.
Ostrolenk, Bernhard,	*Gloversville, N. Y.*,	23 North College.
Parsons, Samuel Reynolds,	North Amherst,	North Amherst.
Patch, Roland Harrison,	Wenham,	88 Pleasant Street.
Pauly, Herman Alfred,	Somerville,	Nash Hall.
Pickard, Percy William,	Hopedale,	7 North College.
Piper, Ralph Waldo,	South Acton,	116 Pleasant Street.
Prouty, Philip Herman,	Shrewsbury,	27 North College.
Racicot, Philias Armand,[1]	Lowell,	South College.
Robinson, Ralph Cushing,	Boston,	9 Fearing Street.
Sharpe, Arthur Harris,	Saxonville,	Kappa Sigma House.
Smith, Clarence Albert,	Northampton,	Forristall's.
Smith, Raymond Goodale,[1]	Lynn,	3 Fearing Street.
Stevenson, Lomas Oswald,	*Hackensack, N. J.*,	87 Pleasant Street.
Warren, Edward Irving,[1]	Leicester,	82 Pleasant Street.
Whitney, Raymond Lee,	Brockton,	21 North College.
Willard, Harold Francis,	Leominster,	44 Pleasant Street,
Winn, Ervin Lawrence,[1]	Holden,	96 Pleasant Street.

Total, 54.

Freshman Class.

Ackerman, Arthur John,	Worcester,	82 Pleasant Street.
Baird, Everett Jamieson,	Clinton,	19 Fearing Street.
Beers, Rowland Trowbridge,	Billerica,	Experiment Station.
Bent, William Richard,	Marlborough,	Brooks Farm.
Birdsall, Webster Jennings,	*Otego, N. Y.*,	58 Pleasant Street.
Bodfish, Edward Hill,	West Barnstable,	6 Allen Street.
Boland, Eric Nicholas,	South Boston,	9 Fearing Street.
Brett, Alden Charles,	North Abington,	Prof. W. P. Brook's.
Brown, Merle Raymond,	Greenwich Village,	60 College Street.
Burr, Frederick Huntington,	Worthington,	Fearing Street (Miss Sargent's).
Cabot, George Dwight,	Winchester,	79 Pleasant Street.
Caldwell, Lawrence Sanborn,	Lynn,	3 McClellan Street.
Campbell, Clare Avery,	Boston,	8 Kellogg Aveune.
Carpenter, Jesse, Jr.,	Attleborough,	Kappa Sigma House.
Castle, Fred Arlo,	*Kansas City, Mo.*,	116 Pleasant Street.
Clapp, Raymond Kingsley,	Westhampton,	Mr. E. H. Forristall's.
Cohen, Harold,	Somerville,	96 Pleasant Street.
Covill, Joseph Warren,	West Roxbury,	9 Fearing Street.
Curran, Daniel Joseph,	Marlborough,	East Pleasant Street.
Daniel, Edward Stephen Coen,	Osterville,	6 Allen Street.
Dee, John Francis,	Worcester,	75 Pleasant Street.
Deming, Winfred Griswold,	*Wethersfield, Conn.*,	75 Pleasant Street.
Dodge, Albert Wesley,	Wenham,	Mr. Walker's.
Durling, Edgar Vincent,	*Brooklyn, N. Y.*,	60 Pleasant Street.
Eastman, Edward Baxter, Jr.,	North Amherst,	Leverett Street.
Eisenhaure, John Louis,	North Reading,	Thompson House.
Ells, Gordon Waterman,	Cambridge,	44 Triangle Street.
Fagerstrom, Leon Emanuel,	Worcester,	82 Pleasant Street.
Finnegan, John Thomas,	Forest Hills,	66 Pleasant Street.
Fisherdick, Warren Francis,	Amherst,	26 South Pleasant Street.
Fitts, Frank Orus,	North Amherst,	North Amherst.
Fitzgerald, John Joseph,	Holyoke,	96 Pleasant Street.
Folger, Ernest Maynard,	Brockton,	17 Fearing Street.
Fowler, George Scott,	Wayland,	44 Pleasant Street.
Frost, John Newton,	Natick,	77 Pleasant Street.
Gallagher, James Andrew,	North Wilmington,	44 Triangle Street.
Gaskill, Lewis Warren,	Hopedale,	Mr. Goldberg's.
Gelinas, Louis Edmund,	North Adams,	Brooks Farm.

---

[1] Work incomplete.

Gibbs, Robert Morey,	Chester,	Brooks Farm.
Gibson, Lester Earle,	Melrose,	44 Triangle Street.
Gray, Frank Leonard,	East Boston,	19 Fearing Street.
Hall, Ralph Sawyer,	Sturbridge,	82 Pleasant Street.
Hamilton, Percy,	*Portland, Me.*,	5 McClellan Street.
Harlow, Joseph Alvin,	Turners Falls,	75 Pleasant Street.
Heald, Jay Morrill,	Watertown,	3 McClellan Street.
Hemenway, Thomas,	Winchester,	79 Pleasant Street.
Hills, Frank Burrows,	Bernardston,	77 Pleasant Street.
Hickey, Francis Benedict,	Brockton,	5 McClellan Street.
Holland, Henry Lucius,	Amherst,	28 North Prospect Street.
Hutchings, Herbert Colby,	South Amherst,	Mr. E. H. Forristall's.
Kingsbury, Arthur French,	Medfield,	Mr. E. H. Forristall's.
Lamson, Robert Ward,	Amherst,	109 Main Street.
Lloyd, Edward Russell,	Boston,	6 Phillips Street.
Lowry, Quincy Shaw,	Canton,	120 Pleasant Street.
Lundgren, Arthur Robert,	Orange,	88 Pleasant Street.
Martin, James Francis,	Amherst,	19 South East Street.
Maxon, Donald Charles,	*Elkhart, Ind.*,	25 Sunset Avenue.
McGarr, Thomas Anthony,	Worcester,	31 East Pleasant Street.
McLean, John Robert,	Medford,	60 Pleasant Street.
Merkle, George Edward,	Amherst,	East Street.
Merrill, Fred Sawyer,	Danvers,	96 Pleasant Street.
Messer, Allen Irving,	Pittsfield,	– –
Moreau, Theodore Joseph,	Turners Falls,	75 Pleasant Street.
Mueller, Alfred Frederick,	Jamaica Plain,	5 Fearing Street.
Norris, Edward Jaffray,	Somerville,	96 Pleasant Street.
Noyes, Harry Alfred,	Marlborough,	120 Pleasant Street.
O'Flynn, George Bernard,	Worcester,	75 Pleasant Street.
Oppel, Eugene Irving,	*Little Falls, N. Y.*,	82 Pleasant Street.
Parker, Ralph Robinson,	Malden,	27 North College.
Pearson, Charles Cornish,	Arlington,	96 Pleasant Street.
Peckham, Curtis,	Clifford,	5 Fearing Street.
Philbrick, William Edwin,	Taunton,	96 Pleasant Street.
Pierpont, John Edwards,	Williamsburg,	79 Pleasant Street.
Pratt, Marshall Cotting,	Lowell,	120 Pleasant Street.
Puffer, Stephen Perry,	North Amherst,	North Amherst.
Raymond, Arthur Nathaniel,	Leominster,	120 Pleasant Street.
Reed, Robert Edward,	Abington,	88 Pleasant Street.
Roberts, Clarence Dwight,	*New Haven, Conn.*,	82 Pleasant Street.
Robinson, Earle Johnson,	Hingham,	116 Pleasant Street.
Rockwood, Lawrence Peck,	*Waterbury, Conn.*,	116 Pleasant Street.
Sanctuary, William Crocker,	Amherst,	147 South Pleasant Street.
Sellew, Lewis Raymond,	Natick,	77 Pleasant Street.
Shaw, Ezra Ingram,	Amherst,	8 Spaulding Street.
Smith, Harrison Edward,	Medford,	27 North College.
Southwick, Benjamin Gilbert,	Buckland,	82 Pleasant Street.
Springer, Isaac,	Boston,	5 Fearing Street.
Stack, Herbert James,	Amherst,	East Pleasant Street.
Tong, Ying Hee,	*Tientsin, China*,	– –
Torrey, Ray Ethan,	North Leverett,	East Pleasant Street.
Tower, Daniel Gordon,	Roxbury,	79 Pleasant Street.
Tucker, John William,	Worcester,	Brooks Farm.
Tupper, George Wilbur,	Roxbury,	96 Pleasant Street.
Turner, Austin Ralph,	Walpole,	75 Pleasant Street.
Turner, Howard Archibald,	Dorchester,	East Pleasant Street and Lover's Lane.
Wales, Robert Webster,	North Abington,	Brooks Farm.
Walker, Herman Chester,	Marlborough,	Brooks Farm.
Warner, Roger Andrew,	Sunderland,	Mr. E. H. Forristall's.
Weaver, William Jack,	Alandar,	6 Allen Street.
Whitney, Charles Edward,	Wakefield,	Brooks Farm.
Wilbur, Emory Sherman,	East Wareham,	101 Pleasant Street.
Wilde, Earle Irving,	Taunton,	Kappa Sigma House.

Williams, Edward Roger,	Concord Junction,	116 Pleasant Street.
Williams, Silas,	Fall River,	Mr. R. J. Goldberg's.
Wood, Howard Holmes,	Shelburne Falls,	10 Allen Street,
Young, Edward Burnham,	Dorchester,	8 Kellogg Avenue.

Total, 116.

WINTER COURSE STUDENTS — 1909.

Adams, Alpheus Rufus,	Northborough.
Adams, Arthur Simonds,	Shrewsbury.
Adams, Fred Carlton,	Amherst.
Aldrich, Leon Henry,	Belchertown.
Allen, James Beatty,	Haverhill.
Allen, Ralph Owen,	West Brookfield.
Avery, Lester Ellsworth,	Plymouth.
Badger, Ralph Alvin,	*Randolph, Vt.*
Barstow, Harold Dunbar,	South Hadley.
Bayer, Harry,	*New York, N. Y.*
Beaubien, Arthur,	Turners Falls.
Belches, Edward Faxon,	South Framingham.
Bibber, John Carleton,	*Freeport, Me.*
Bodette, Eugene,	*Vergennes, Vt.*
Brown, Leland Elliott,	Deerfield.
Clarke, Chester Thomas,	Reading.
Cole, Frederick William,	Greenbush.
Copeland, Harvey Leland,	Colrain.
Creswell, Albert,	West Brookfield.
Davidson, Wilbur King,	West Millbury.
Derr, Paul Ambrose,	*Williamsport, Pa.*
Drummery, Dennis Edward,	Marlborough.
Dustin, Otis Ellsworth,	Monson.
Felch, George Alfred,	Ayer.
Fennely, N. J.,	Boston.
Forbes, Ralph Monroe,	Worcester.
Gallagher, Hugh John,	New Lebanon.
Galarnean, Arthur Leopold,	*North Bay, Ont.*
Gaskill, Clayton Wood,	South Milford.
Headle, Everett Waldo,	Bolton.
Hemenway, Lee,	*Bridport, Vt.*
Hepburn, William Kirkland,	Sunderland.
Holcomb, Tudor Frederick,	West Granby.
Howard, Everett Clapp,	Belchertown.
Imlay, William Sylvester,	*Zanesville, O.*
Johnson, Esther Marguerite,	Cambridge.
Keith, Harold Newell,	West Boylston.
Larsen, Augustus Francis,	Pride's Crossing.
Lyon, Lawrence Whitman,	Abington.
MacDonald, Charles Grant,	Medway.
McGauvran, Lizzie,	Fisherville.
McGonigle, Cornelius James,	Worcester.
McMaster, Percy Elmer,	*New York, N. Y.*

Midgeley, Frank Leonard,	Worcester.
Nelson, David Arvid,	Avon.
Nevius, Richmond,	Rochester.
Nye, Edmund Russell,	Russell.
Ordway, Carroll Colby,	West Newbury.
Osborn, William,	*Cos Cob, Conn.*
Perrin, Emmet Mark Fred,	*Potsdam, N. Y.*
Phelps, Arthur Augustus,	Southborough.
Phillips, Emerson Orin,	Huntington.
Richards, George Frank,	Williamsburg.
Schmitz, Eugene Alfonso Ricardo,	Danvers.
Smith, William Henry,	Great Barrington.
Stone, Daniel Earle,	Attleborough.
Sutcliffe, John Rowell,	North Billerica.
Tanner, Fred William,	North Adams.
Thayer, Robert Eugene,	Franklin.
Tilden, J. Alexander,	*Cleveland, O.*
Thompson, Charles Wilfred,	Attleborough.
Turner, Harvey Gay,	North Reading.
Ware, William Crosby,	Concord.
Warfield, Arthur Henry, Jr.,	West Brookfield.
Welch, Harlow,	Boston.
Welch, Wilbert Eben, Jr.,	Boston.
Wilcox, Lauriston Anson,	*North Pownal, Vt.*
Young, Earle Leonard,	South Hadley Center.

Total, 66.

SUMMER SCHOOL STUDENTS — 1908.

Adams, Lena R.,	North Brookfield.
Allison, Catherine D.,	Northampton.
Ammidown, Eva B.,	Roslindale.
Ayer, Elizabeth E.,	*Saybrook, Conn.*
Barrett, Florence,	Cambridge.
Barrett, Mrs. Sarah,	Cambridge.
Barry, Mary,	Amherst.
Barry, Veronica,	Amherst.
Barton, Alice M.,	West Roxbury.
Bates, Mabel L.,	East Wareham.
Belcher, S. Elisabeth,	Worcester.
Best, Fannie E.,	*New Dorp, N. Y.*
Billings, Mrs. G. A.,	*Washington, D. C.*
Breaker, Carl H.,	Northampton.
Brooks, Laura J.,	Stoneham.
Buckley, Emma,	Worcester.
Burgess, Louisa W.,	Dorchester Center.
Butterfield, Annie J.,	Worcester.
Callahan, Mary J.,	Worcester.
Carley, Lilian M.,	*New York City.*
Chace, S. Howard,	Lowell.

Chase, Alice C.,	Lynn.
Cheney, Hazel Chase,	Amherst.
Churbuck, Bessie L.,	East Wareham.
Church, Helen L.,	Shelburne Falls.
Churchill, Abby P.,	Fitchburg.
Clark, Eva H.,	Sandwich.
Clark, Orton L.,	Amherst.
Clay, Charles L.,	Harvard.
Clough, Jennie S.,	Cambridge.
Cochran, Agnes M.,	South Boston.
Cooney, Helen T.,	Lawrence.
Cotta, Florence L.,	Worcester.
Cram, Julia H.,	Brookline.
Curley, Thomas F.,	Waltham.
Currier, Frances W.,	Brighton.
Davis, Carrie I.,	Taunton.
Davis, Florence I.,	Bridgewater.
Donelson, Lura,	Greenfield.
Dorph, Bernhard,	Amherst.
Dorr, Clara L.,	Dorchester.
Draper, Lizette M.,	Worcester.
Dunham, Annie D.,	Island Creek.
Dupuy, Helen A.,	*Chicago, Ill.*
Earle, Elizabeth,	*New Haven, Conn.*
Eaton, Luella,	Needham Heights.
Farwell, Minnie G.,	Walpole.
Fay, Louise,	Waltham.
Fletcher, Florence A.,	Wakefield.
French, Mrs. Clara Graves,	*Weston, Ore.*
Gavin, Agnes M.,	Roxbury.
Gilbert, Pauline,	Amherst.
Goodnow, Edna M.,	Amherst.
Goodwin, Rev. Sherman,	*South Royalton, Vt.*
Gracey, F. M.,	Amherst.
Granger, Helen,	Cambridge.
Graves, Bessie M.,	Southampton.
Greene, Rev. M. N.,	Amherst.
Griffeth, Mary A.,	East Wareham.
Gustin, Rev. B. F.,	North Amherst.
Haskell, Mabelle W.,	Lynn.
Haskell, Sarah E.,	Medway.
Hastings, George H.,	Fitchburg.
Haynes, Julia A.,	Hyannis.
Heath, Chester B.,	Dedham.
Heatly, Elisabeth,	Fall River.
Hoagland, Rev. N. S.,	Tyngsborough.
Hopkins, Elizabeth,	Winchester.
Howard, Alice M.,	Taunton.
Howard, Annie G.,	Taunton.
Howes, A. F.,	Sheffield.

Howland, Florence B.,	Somerville.
Howland, Gertrude S.,	Revere.
Howland, Mary A.,	Sandwich.
Hutchings, F. F.,	Amherst.
Ingalls, Maud,	Cheshire.
Ingalls, May D.,	Cheshire.
Irwin, Grace W.,	Sandwich.
Jason, May,	New Bedford.
Kendrick, Jean,	Amherst.
Killion, Anna L.,	Roxbury.
Kilmer, Sarah E.,	Boston.
Lamphier, Annie J.,	North Adams.
Larkin, Martha M.,	Lynn.
Lewis, Winifred,	Rochester.
Lilley, Alice,	Fairhaven.
Lillis, Marguerite,	Roxbury.
Lovejoy, Blanche S.,	Haverhill.
Marvin, Donald,	*New London, Conn.*
Marvin, Gerald,	*New London, Conn.*
Marvin, Mrs. Walter,	*New London, Conn.*
Marvin, Rev. Walter,	*New London, Conn.*
Mason, Isadore H.,	Gardner.
Mattson, Mrs. W. F.,	Brookline.
Mattson, W. Rhoades,	Brookline.
Mead, Ella,	*Brooklyn, N. Y.*
Meggett, Marshall M.,	Brookline.
Miller, Susie T.,	Brockton.
Mitchell, Margaret D.,	Charlestown.
Mitchell, Mary C.,	Charlestown.
Morgan, Agnes,	Amherst.
Moulton, Sarah H.,	West Lynn.
Muirhead, Rev. A. Stanley,	East Bridgewater.
Murray, Anna M.,	Worcester.
Murray, E. Frances,	Cambridge.
Murray, Florence H.,	Cambridge.
Murray, Rupert H.,	*New Rochelle, N. Y.*
Negus, Ruth,	Fall River.
Nelligan, K. M.,	Amherst.
Nevius, Richmond,	Rochester.
New, Mary A.,	Amherst.
Newell, A. E.,	South Boston.
Nicholson, Madge C.,	Wareham.
Nishimiya, Masutaro,	Amherst.
Oakley, Mary F.,	*Brooklyn, N. Y.*
Pardee, Rev. J. N.,	Bolton.
Parker, Agnes C.,	Uxbridge.
Parker, Winifred Lenore,	Holyoke.
Parkhurst, Dorothy,	Amherst.
Parsons, Sally,	Lynn.
Paul, Maria E.,	Lynn.

Paulsen, George W.,	*Tremont, New York City.*
Perkins, Emily,	Woburn.
Phalen, Mrs. Frank L.,	Fairhaven.
Phalen, Rev. Frank L.,	Fairhaven.
Pierpont, Rev. John,	Williamsburg.
Pond, E. W.,	Sheffield.
Post, Edna A.,	*Gilead, Conn.*
Post, Jessie L.,	*Gilead, Conn.*
Rich, Frank M.,	North Weymouth.
Robinson, Mrs. Alice M.,	South Boston.
Robinson, Mary B.,	Waltham.
Roehrs, Herman I.,	*New York City.*
Rossiter, Irmagarde,	*Hartford, Conn.*
Rowe, Mildred,	Amherst.
Roy, G. Calister,	Watertown.
Scott, Mary L.,	Worcester.
Seavey, Alma F.,	Natick.
Shipman, Julia,	Boston.
Shores, Iva,	Amherst.
Shumway, Ruby M.,	South Amherst.
Skerrett, Sarah V.,	Worcester.
Smith, Annie E.,	Springfield.
Smith, Hattie E.,	Wareham.
Stimson, Mrs. Helen M.,	Northampton.
Stone, Melville A.,	Reading.
Streeter, Lilla M.,	Millbury.
Sullivan, Esther F.,	Charlestown.
Swett, Lena S.,	*Burlington, Vt.*
Sylvester, Charles B.,	Haverhill.
Taylor, Rev. James D.,	Amherst.
Tierney, Margaret E.,	Lawrence.
Tierney, William A.,	Worcester.
Tobin, Ellen C.,	Lawrence.
Tufts, Mary I.,	Lynn.
Turner, Howard A.,	Amherst.
Verbeck, Roland H.,	Malden.
Waters, Mrs. F. P.,	*Rocky Hill, Conn.*
Waters, Rev. F. P.,	*Rocky Hill, Conn.*
Waugh, Dorothy,	Amherst.
Waugh, Thomas F.,	Worcester.
Weed, Susan M.,	*Wethersfield, Conn.*
Weston, Marion L.,	Roslindale.
Whitton, Jennie E.,	*Hazardville, Conn.*

Total, 166.

SUMMARY BY CLASSES.

Graduate students,	14	
Special students,	1	
Senior class,	50	
Junior class,	47	
Sophomore class,	54	
Freshman class,	116	
		282
Winter course,	66	
Summer school,	166	
		232
Total,		514

GEOGRAPHICAL SUMMARY.

	The College.	The Short Courses.
Connecticut,	7	15
Delaware,	1	–
District of Columbia,	–	1
Illinois,	–	1
Indiana,	2	–
Maine,	2	2
Massachusetts,	236	181
Michigan,	1	–
Missouri,	1	–
New Hampshire,	2	–
New Jersey,	4	–
New York,	11	13
Ohio,	1	4
Oregon,	–	1
Pennsylvania,	–	1
Rhode Island,	3	–
Vermont,	1	10
China,	4	–
Cuba,	2	–
England,	1	–
Japan,	1	–
Ontario,	1	1
Syria,	1	–
Totals,	282	232

ADDENDA.

I.

ABSTRACT OF THE ADMISSION REQUIREMENTS STATED IN THE CATALOGUE OF 1907–08.

The examinations in June and September, 1909, will be based on these requirements; but certificates will be accepted either on these or on the revised requirements already stated, as the applicant may elect.

Requirements.

The candidate to be at least sixteen years old, and to furnish testimonials proving good moral character.

The candidate to furnish an acceptable certificate or to pass an examination showing preparatory study in three groups of studies, as follows: —

Group I. Language.

Sub-group 1: English (required).
Sub-group 2: French or German (*one* required).

Group II. History and Civics.

Sub-group 1: United States history and civics (required).
Sub-group 2: History (elective; *one* required).
  (*a*) Ancient history.
  (*b*) Medieval and modern history.
  (*c*) English history.
  (*d*) General history.

Group III. Mathematics and Science.

Sub-group 1: Algebra, through quadratics (required).
Sub-group 2: Plane geometry (required).
Sub-group 3: Any *two* of the following (required): —
  (*a*) Chemistry.
  (*b*) Physiology.
  (*c*) Solid geometry.

Explanation of Requirements.

GROUP I. LANGUAGE. — In *English,* candidates must be able to meet the usual college requirements (as defined by the College Entrance Examination Board[1]) except that one calling for the detailed study of books under division *B* of the current list of recommended books. The college insists that applicants be able to interpret at sight unfamiliar prose and verse of medium difficulty, and that they be familiar with grammar. The examination will be based on the books here named; but if an applicant wishes to be examined upon others of those included in the standard list, he will be so examined, provided he notify the Department of English by June 1, 1909.

Books. — Shakspere's "Macbeth" and "The Merchant of Venice;" Milton's "Lycidas," "Comus," "L'Allegro" and "Il Penseroso;" Webster's "First Bunker Hill Oration," with either Burke's "Speech on Conciliation" or Washington's "Farewell Address;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine," and "The Passing of Arthur;" Ruskin's "Sesame and Lilies;" Bunyan's "Pilgrim's Progress" (Part I.); Scott's "Quentin Durward;" either Macaulay's "Life of Johnson" or Carlyle's "Essay on Burns."

In *French* or *German,* candidates must offer one year of elementary work as defined in the requirements of the College Entrance Examination Board.[1]

GROUP II. HISTORY AND CIVICS. — Preparation in the subjects of Group II. will be satisfactory if made in accordance with the recommendations of the Committee of Seven of the American Historical Association, as outlined by the College Entrance Examination Board.[1] The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory.

GROUP III. MATHEMATICS AND OTHER SCIENCES. — It is strongly recommended that students preparing for entrance take the mathematical review offered in most high school courses.

Algebra. — Through the first twenty-three chapters of Wells's "College Algebra," or an equivalent. The student should be thoroughly drilled in the fundamental operations.

Plane Geometry. — All of plane geometry as given in Wells, or an equivalent.

---

[1] Address sub-station 84, New York City.

Solid Geometry. — All of Wells's "Solid Geometry," or an equivalent.

Chemistry. — The following chapters in Newth's "Inorganic Chemistry" or Newell's "Descriptive Chemistry," or their equivalents: —

Newth — Part 1. Chapters I. to VII. inclusive.
Part 2. Chapters I. to VIII. inclusive.
Newell — Chapters I. to XII. inclusive.

Physiology. — The equivalent of Hough & Sedgwick's "The Human Mechanism." The examination is based on this book.

Certification.

Certificates must present at least 50 per cent. of the subjects required for entrance, and deficient subjects must be made up by examination upon entrance or within the first semester.

The certificate must come from a school approved (*a*) by the college, or (*b*) by the College Entrance Examination Boards, or else must be the usual credentials from the New York State Board of Regents. Blank forms will be furnished, but only to principals or superintendents.

II.

Alumni Associations and Class Secretaries.

Alumni Associations.

The Associate Alumni of the Massachusetts Agricultural College.
President, Austin Peters, '81, Boston, Mass.
Secretary, H. F. Tompson, '05, Amherst, Mass.

The Local Alumni Association of the Massachusetts Agricultural College.
President, Robert W. Lyman, '71, Northampton, Mass.
Secretary, A. C. Monahan, '00, Turners Falls, Mass.

The Alumni Club of Massachusetts.
President, F. W. Davis, '89, Roslindale, Mass.
Secretary, Newton Shultis, '96, Boston, Mass.

The Connecticut Valley Association of the Massachusetts Agricultural College Alumni.
President, Chas. A. Goodrich, '93, Hartford, Conn.
Secretary, Walter B. Hatch, '05, Hartford, Conn.

The Massachusetts Agricultural College Club of New York.
President, Chas. E. Lyman, '78, Middlefield, Conn.
Secretary, Dr. John A. Cutter, '82, 325 West Eighty-third Street, New York, N. Y.

The Massachusetts Agricultural Club of Washington, D. C.
President, C. S. Crocker, '89, 25 South Van Pelt Street, Philadelphia, Pa.
Secretary, F. D. Couden, '04, 1310 Columbia Road, Washington, D. C.

The Western Alumni Association of the Massachusetts Agricultural College.
President, A. B. Smith, '95, 544 Winnemac Avenue, Chicago, Ill.
Secretary, M. H. West, '03, 28 Lindon Court, Chicago, Ill.

Class Secretaries.

Class of	Secretary.	Secretary's address.
1871	E. E. Thompson,	Worcester, Mass.
1872	S. T. Maynard,	Northborough, Mass.
1873	C. Wellington,	Amherst, Mass.
1874	–	– –
1875	M. Bunker,	Newton, Mass.
1876	C. Fred Deuel,	Amherst, Mass.
1877	–	– –
1878	C. O. Lovell,	48 Summer Street, Boston, Mass.
1879	R. S. Swan,	Worcester, Mass.
1880	–	– –
1881	J. L. Hills,	Burlington, Vt.
1882	G. D. Howe,	Bangor, Me.
1883	S. M. Holman,	Attleborough, Mass.
1884	L. Smith,	25 Mercantile Street, Worcester, Mass.
1885	E. W. Allen,	Washington, D. C.
1886	Dr. Winfield Ayres,	616 Madison Avenue, New York, N. Y.
1887	F. H. Fowler,	136 State House, Boston, Mass.
1888	H. C. Bliss,	Attleborough, Mass.
1889	C. S. Crocker,	25 South Van Pelt Street, Philadelphia, Pa.
1890	F. W. Mossman,	Westminster, Mass.
1891	W. A. Brown,	Greenfield, Mass.
1892	H. M. Thomson,	Amherst, Mass.
1893	F. A. Smith,	Ipswich, Mass.
1894	S. F. Howard,	Amherst, Mass.
1895	H. A. Ballou,	Barbadoes, W. I.
1896	–	– –
1897	C. A. Peters,	Moscow, Idaho.
1898	S. W. Wiley,	15 South Gay Street, Baltimore, Md.
1899	D. A. Beaman,	Ponce, Porto Rico
1900	E. K. Atkins,	Northampton, Mass.
1901	J. H. Chickering,	Dover, Mass
1902	H. L. Knight,	1731 T Street, Washington, D. C.
1903	G. D. Jones,	North Amherst, Mass.
1904	P. F. Staples,	North Grafton, Mass.
1905	P. F. Williams,	Milton, Mass.
1906	Richard Wellington,	Geneva, N. Y.
1907	G. H. Chapman,	Amherst, Mass.
1908	Jas. A. Hyslop,	205 D Street, Washington, D. C.

INDEX.

PAGE
Admission 23–33
Advanced standing 31
Agricultural education 37
Agriculture 38
Agronomy 38
Alumni organizations. (See Addenda.)
Animal husbandry 39
Attendance, summary of 123
Awards 107

Bacteriology 70
Bee culture 89
Botany 42, 79

Calendar 7
Certificates, admission on 23
Chemistry 45, 79
Civil engineering 62–64
Clubs, etc. 106, 107
College officers 14–16
Committees of faculty 19
Corporation 12
Courses of instruction:
  Undergraduate 34–71
  Graduate 75–82

Dairying 40
Degrees conferred 111
Dormitories 93
Drawing 53

Economics 61, 68, 69
English 54–58
Entomology 47, 80
Entrance. (See Admission.)
Equipment of departments 98–106
Examinations, entrance 23, 24
Expenses 93–96
Experiment station 11, 17

Faculty 14
Faculty committees 19
Farm administration 42
Fellowships. (See Scholarships.)
Floriculture 50
Forestry 49
French 58

General information 93–108
Geology 71
German 60
Government 61
Graduate school 75–82

PAGE
History 61, 63
Honors 107
Horticulture 48, 81
Humanities 53
Hygiene 66, 67

Landscape gardening 51
Languages, modern European. (See French, German, Spanish.)
Law 69
Library 102
Literature 56

Market gardening 52
Massachusetts Agricultural College 9
Massachusetts Agricultural Experiment Station 11
Mathematics 62–64
Military science 64–66
Music 61

Organizations, student 106

Physical education 67
Physics 62, 63
Political science 61
Pomology 50
Prizes 97, 98
Public speaking 58

Religious services 106
Roll of students 111–123
Rural social science 68, 69

Scholarships 97
Short courses 85–89
Sociology 69
Spanish 59
Student expenses 93–96
Students, roll of 111–123
Summer school 85–88

Table of undergraduate subjects 34–36
Trustees, etc. 12

Undergraduate courses 37–71

Veterinary science 70

Winter school 88, 89

Zoölogy 70, 71, 82

THE M. A. C. BULLETIN

AMHERST, MASS.

Vol. II. No. 4. For May, 1910.

Published Six Times a Year by the College.
Jan., Feb., Mar., May, Sept., Oct.

Entered as Second-class Mail Matter at the Post Office, Amherst, Mass.

Public Document No. 31

CATALOGUE

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE,

1909-1910.

FORTY-SEVENTH ANNUAL REPORT.

PART II.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 Post Office Square.
1910.

> Without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. — *Act of Congress, July 2, 1862.*

MASSACHUSETTS AGRICULTURAL COLLEGE,

AMHERST.

CATALOGUE, 1909-1910.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1910.

Approved by

The State Board of Publication.

Vacations and holidays are indicated by light-faced type.

1909.

JULY.

S	M	T	W	Th	F	S
. .	. .	. .	. .	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
. .	. .	. .	. .	. .	. .	. .

AUGUST.

S	M	T	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	. .	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

SEPTEMBER.

S	M	T	W	Th	F	S
. .	. .	. .	1	2	3	4
5	6	7	8	9	10	11
12	13	14	**15**	**16**	**17**	**18**
19	**20**	**21**	**22**	**23**	**24**	**25**
26	**27**	**28**	**29**	**30**	. .	. .
. .	. .	. .	. .	. .	. .	. .

OCTOBER.

S	M	T	W	Th	F	S
. .	. .	. .	. .	. .	**1**	**2**
3	**4**	**5**	**6**	**7**	**8**	**9**
10	**11**	**12**	**13**	**14**	**15**	**16**
17	**18**	**19**	**20**	**21**	**22**	**23**
24	**25**	**26**	**27**	**28**	**29**	**30**
31	. .	. .	. .	. .	. .	. .

NOVEMBER.

S	M	T	W	Th	F	S
. .	**1**	**2**	**3**	**4**	**5**	**6**
7	**8**	**9**	**10**	**11**	**12**	**13**
14	**15**	**16**	**17**	**18**	**19**	**20**
21	**22**	**23**	24	25	26	27
28	29	**30**	. .	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

DECEMBER.

S	M	T	W	Th	F	S
. .	. .	. .	**1**	**2**	**3**	**4**
5	**6**	**7**	**8**	**9**	**10**	**11**
12	**13**	**14**	**15**	**16**	**17**	18
19	20	21	22	23	24	25
26	27	28	29	30	31	. .
. .	. .	. .	. .	. .	. .	. .

1910.

JANUARY.

S	M	T	W	Th	F	S
. .	. .	. .	. .	. .	. .	1
2	3	**4**	**5**	**6**	**7**	**8**
9	**10**	**11**	**12**	**13**	**14**	**15**
16	**17**	**18**	**19**	**20**	**21**	**22**
23	**24**	**25**	**26**	**27**	**28**	**29**
30	**31**	. .	. .	. .	. .	. .

FEBRUARY.

S	M	T	W	Th	F	S
. .	. .	**1**	**2**	**3**	**4**	**5**
6	**7**	**8**	**9**	**10**	**11**	**12**
13	**14**	**15**	**16**	**17**	**18**	**19**
20	**21**	22	**23**	**24**	**25**	**26**
27	**28**	. .	. .	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

MARCH.

S	M	T	W	Th	F	S
. .	. .	**1**	**2**	**3**	**4**	**5**
6	**7**	**8**	**9**	**10**	**11**	**12**
13	**14**	**15**	**16**	**17**	**18**	**19**
20	**21**	**22**	**23**	**24**	**25**	26
27	28	29	30	31	. .	. .
. .	. .	. .	. .	. .	. .	. .

APRIL.

S	M	T	W	Th	F	S
. .	. .	. .	. .	. .	1	2
3	4	**5**	**6**	**7**	**8**	**9**
10	**11**	**12**	**13**	**14**	**15**	**16**
17	**18**	19	**20**	**21**	**22**	**23**
24	**25**	**26**	**27**	**28**	**29**	**30**
. .	. .	. .	. .	. .	. .	. .

MAY.

S	M	T	W	Th	F	S
1	**2**	**3**	**4**	**5**	**6**	**7**
8	**9**	**10**	**11**	**12**	**13**	**14**
15	**16**	**17**	**18**	**19**	**20**	**21**
22	**23**	**24**	**25**	**26**	**27**	**28**
29	30	**31**	. .	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

JUNE.

S	M	T	W	Th	F	S
. .	. .	. .	**1**	**2**	**3**	**4**
5	**6**	**7**	**8**	**9**	**10**	**11**
12	**13**	**14**	**15**	**16**	**17**	**18**
19	**20**	**21**	**22**	23	24	25
26	27	28	29	30	. .	. .
. .	. .	. .	. .	. .	. .	. .

JULY.

S	M	T	W	Th	F	S
. .	. .	. .	. .	. .	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	. .	. .	. .	. .	. .	. .

AUGUST.

S	M	T	W	Th	F	S
. .	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

SEPTEMBER.

S	M	T	W	Th	F	S
. .	. .	. .	. .	1	2	3
4	5	6	7	8	9	10
11	12	13	**14**	**15**	**16**	**17**
18	**19**	**20**	**21**	**22**	**23**	**24**
25	**26**	**27**	**28**	**29**	**30**	. .
. .	. .	. .	. .	. .	. .	. .

OCTOBER.

S	M	T	W	Th	F	S
. .	. .	. .	. .	. .	. .	**1**
2	**3**	**4**	**5**	**6**	**7**	**8**
9	**10**	**11**	**12**	**13**	**14**	**15**
16	**17**	**18**	**19**	**20**	**21**	**22**
23	**24**	**25**	**26**	**27**	**28**	**29**
30	**31**	. .	. .	. .	. .	. .

NOVEMBER.

S	M	T	W	Th	F	S
. .	. .	**1**	**2**	**3**	**4**	**5**
6	**7**	**8**	**9**	**10**	**11**	**12**
13	**14**	**15**	**16**	**17**	**18**	**19**
20	**21**	**22**	**23**	24	25	26
27	**28**	**29**	**30**	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

DECEMBER.

S	M	T	W	Th	F	S
. .	. .	. .	. .	**1**	**2**	**3**
4	**5**	**6**	**7**	**8**	**9**	**10**
11	**12**	**13**	**14**	**15**	**16**	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
. .	. .	. .	. .	. .	. .	. .

1911.

JANUARY.

S	M	T	W	Th	F	S
1	**2**	**3**	**4**	**5**	**6**	**7**
8	**9**	**10**	**11**	**12**	**13**	**14**
15	**16**	**17**	**18**	**19**	**20**	**21**
22	**23**	**24**	**25**	**26**	**27**	**28**
29	**30**	**31**	. .	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

FEBRUARY.

S	M	T	W	Th	F	S
. .	. .	. .	**1**	**2**	**3**	**4**
5	**6**	**7**	**8**	**9**	**10**	**11**
12	**13**	**14**	**15**	**16**	**17**	**18**
19	**20**	**21**	22	**23**	**24**	**25**
26	**27**	**28**	. .	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

MARCH.

S	M	T	W	Th	F	S
. .	. .	. .	**1**	**2**	**3**	**4**
5	**6**	**7**	**8**	**9**	**10**	**11**
12	**13**	**14**	**15**	**16**	**17**	**18**
19	**20**	**21**	**22**	**23**	**24**	25
26	27	28	29	30	31	. .
. .	. .	. .	. .	. .	. .	. .

APRIL.

S	M	T	W	Th	F	S
. .	. .	. .	. .	. .	. .	1
2	**3**	**4**	**5**	**6**	**7**	**8**
9	**10**	**11**	**12**	**13**	**14**	**15**
16	**17**	**18**	19	**20**	**21**	**22**
23	**24**	**25**	**26**	**27**	**28**	**29**
30	. .	. .	. .	. .	. .	. .

MAY.

S	M	T	W	Th	F	S
. .	**1**	**2**	**3**	**4**	**5**	**6**
7	**8**	**9**	**10**	**11**	**12**	**13**
14	**15**	**16**	**17**	**18**	**19**	**20**
21	**22**	**23**	**24**	**25**	**26**	**27**
28	**29**	30	**31**	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

JUNE.

S	M	T	W	Th	F	S
. .	. .	. .	. .	**1**	**2**	**3**
4	**5**	**6**	**7**	**8**	**9**	**10**
11	**12**	**13**	**14**	**15**	**16**	**17**
18	**19**	**20**	**21**	22	23	24
25	26	27	28	29	30	. .
. .	. .	. .	. .	. .	. .	. .

THE MASSACHUSETTS AGRICULTURAL COLLEGE.

CALENDAR.

Graduate School and College.

1910.

January 3, Monday, 1 P.M.,	Winter recess ends; assembly.
January 31, Monday,	Semester examinations begin.
February 7, Monday, 1 P.M.,	Second semester begins; assembly.
February 22, Tuesday,	Washington's Birthday, holiday.
March 25, Friday, 6 P.M.,	Spring recess begins.
April 4, Monday, 1 P.M.,	Spring recess ends; assembly.
April 19, Tuesday,	Patriot's Day, holiday.
May 30, Monday,	Memorial Day, holiday.
June 6, Monday,	Senior examinations begin.
June 14, Tuesday,	Non-senior examinations begin.
June 18–22, Saturday–Wednesday,	Commencement exercises.
June 23–25, Thursday–Saturday,	Entrance examinations.
Summer vacation.	
September 12–14, Monday–Wednesday,	Entrance examinations.
September 12–14, Monday–Wednesday,	Condition examinations.
September 14, Wednesday, 1.30 P.M.,	First semester begins; assembly.
November 23–28, Wednesday, 1 P.M.–Monday, 1 P.M., chapel,	Thanksgiving recess.
December 16, Friday, 6 P.M.,	Winter recess begins.

1911.

January 2, Monday, 1 P.M.,	Winter recess ends; chapel.
January 30, Monday,	Semester examinations begin.
February 6, Monday, 1 P.M.,	Second semester begins; chapel.
February 22, Wednesday,	Washington's Birthday, holiday.
March 24, Friday, 6 P.M.,	Spring recess begins.
April 3, Monday, 1 P.M.,	Spring recess ends; chapel.
April 19, Wednesday,	Patriot's Day, holiday.
May 30, Tuesday,	Memorial Day, holiday.
June 5, Monday,	Senior examinations begin.
June 13, Tuesday,	Non-senior examinations begin.
June 17–21, Saturday–Wednesday,	Commencement.
June,	Entrance examinations.

Short Courses.

Summer school, begins July 11, 1910.
Ten weeks' winter course, Jan. 2–March 10, 1911.
Short poultry course, Feb. 27–March 10, 1911.
Farmers' week, March 13–17, 1911.
Beekeepers' course, May 24–June 7, 1910.
Correspondence courses, October 1–June 1.

MASSACHUSETTS AGRICULTURAL COLLEGE.

HISTORY. — The Massachusetts Agricultural College was among the colleges organized under the national land grant act of 1862. This act gave public lands to the several States and Territories for the establishment of colleges for the benefit of agriculture and the mechanic arts; it was framed by the late Senator Justin Smith Morrill of Vermont. For our own college, liberal appropriations are also made by the Legislature of Massachusetts.

The college was incorporated in 1863, and on the 2d of October, 1867, was formally opened to an entering class of 33. In January, 1875, an arrangement was made with the authorities of Boston University under which the college, without losing its independence, became the school of agriculture of the university. Under this arrangement, graduates of the Massachusetts Agricultural College may, upon certain conditions, receive the diploma in science awarded to graduates of the university. In 1882 the State experiment station was located at the college. It has since been incorporated with the college.

COURSES. — The college offers a free education to any American student who may fulfill the requirements of admission. Women are admitted on the same standing as men. Foreign students pay a tuition fee. The four-years course leads to the degree of bachelor of science, and graduate courses are given leading to the degrees of master of science and of doctor of philosophy. Winter courses of ten weeks are offered, and, upon announcement, special courses. There is also a summer school of agriculture, designed chiefly for persons desiring to teach agriculture in the elementary and high schools.

PURPOSE OF THE COLLEGE. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement, the term "agricultural" is used in the broadest sense. Courses are offered which give efficiency in various practical pursuits, such as general farming, dairying, the management of estates, fruit growing, glass farming, landscape gardening, forestry and arboriculture. Students also qualify for positions in institutions designed for investigation in the many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, and for business occupations having connection with the farm and needing expert service.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences — particularly chemistry, physics, mathematics and engineering — are an essential preparation. Still other students find the course a splendid general education, without regard to future occupation. The course is well balanced; each student is required to study English, a modern foreign language, literature, political science and history.

LOCATION AND EQUIPMENT. — Situated in the beautiful town of Amherst, the college has an inspiring outlook. The campus is especially attractive. The grounds comprise more than 400 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst, 97 miles west of Boston, is on the Central Vermont Railroad and the Central Massachusetts division of the Boston & Maine Railroad. Electric car lines connect the village with Northampton, Holyoke, Springfield and other cities. The town library is open to students, in addition to the college library, as are also good courses of lectures and concerts in the village, supplementing the various interests of college life.

THE MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college. It was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about two-fifths of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to the committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, extension work and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

The Corporation.

Members of the Corporation.

	TERM EXPIRES.
Thomas L. Creeley of Belmont,	1911
Charles H. Preston of Danvers,	1911
Davis R. Dewey of Cambridge,	1912
M. Fayette Dickinson of Brookline,	1912
William H. Bowker of Concord,	1913
George H. Ellis of West Newton,	1913
Charles E. Ward of Buckland,	1914
Elmer D. Howe of Marlborough,	1914
Nathaniel I. Bowditch of Framingham,	1915
William Wheeler of Concord,	1915
Arthur G. Pollard of Lowell,	1916
Charles A. Gleason of New Braintree,	1916
Frank Gerrett of Greenfield,	1917
Harold L. Frost of Arlington,	1917

Members Ex Officio.

His Excellency Governor Eben S. Draper, *President of the Corporation.*
Kenyon L. Butterfield, *President of the College.*
David Snedden, *State Commissioner of Education.*
J. Lewis Ellsworth, *Secretary of the State Board of Agriculture.*

Officers of the Corporation.

His Excellency Governor Eben S. Draper of Boston, *President.*
Charles A. Gleason of New Braintree, *Vice-President.*
J. Lewis Ellsworth of Worcester, *Secretary.*
Fred C. Kenney of Amherst, *Treasurer.*
Charles A. Gleason of New Braintree, *Auditor.*

Standing Committees of the Corporation. [1]

Committee on Finance.

Charles A. Gleason, *Chairman.*
George H. Ellis.
Arthur G. Pollard.
Charles E. Ward.
Charles H. Preston.

---

[1] The president of the college is ex officio member and secretary of standing committees. The director of the experiment station is a member of the committee on experiment department, without vote.

Committee on Course of Study and Faculty.

William Wheeler, *Chairman.*
William H. Bowker.
M. Fayette Dickinson.
David Snedden.
Elmer D. Howe.
Davis R. Dewey.

Committee on Farm and Horticulture.

Farm Division.

George H. Ellis, *Chairman.*
Frank Gerrett.
Charles A. Gleason.
Nathaniel I. Bowditch.

Horticultural Division.

J. Lewis Ellsworth, *Chairman.*
Thomas L. Creeley.
Elmer D. Howe.
Harold L. Frost.

Committee on Experiment Department.

Charles H. Preston, *Chairman.*
J. Lewis Ellsworth.
Arthur G. Pollard.
Charles E. Ward.
Harold L. Frost.

Committee on Buildings and Arrangement of Grounds.

M. Fayette Dickinson, *Chairman.*
William Wheeler.
Frank Gerrett.
William H. Bowker.
Nathaniel I. Bowditch.

OFFICERS OF THE INSTITUTION.

THE FACULTY.

[The names of the faculty are arranged in groups according to rank. Within these groups the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held.]

Kenyon L. Butterfield, A.M., ... 25 Sunset Avenue.
President of the College and Professor of Rural Sociology.

George F. Mills, M.A., ... 46 Amity Street.
Dean of the College, Head of the Division of the Humanities and Professor of Languages and Literature.

Charles H. Fernald, Ph.D., ... 3 Hallock Street.
Director of the Graduate School and Professor of Zoölogy.

William P. Brooks, Ph.D., . . . Massachusetts Agricultural College.
Director of the Experiment Station and Lecturer on Soil Fertility.

William D. Hurd, M.Agr., ... 82 Pleasant Street.
Director of Short Courses.

Frank A. Waugh,[1] M.Sc., . . . Massachusetts Agricultural College.
Head of the Division of Horticulture and Professor of Landscape Gardening.

James A. Foord, M.Sc., ... Nutting Avenue.
Acting Head of the Division of Agriculture and Professor of Farm Administration.

Charles A. Goessmann, Ph.D., LL.D., ... Amity Street.
Honorary Professor of Chemistry and Honorary Director of the Experiment Station.

Charles Wellington, Ph.D., ... 34 Amity Street.
Professor of General and Agricultural Chemistry.

James B. Paige, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Professor of Veterinary Science.

George E. Stone, Ph.D., ... Mount Pleasant.
Professor of Botany.

John E. Ostrander, A.M., C.E., ... 33 North Prospect Street.
Professor of Mathematics and Civil Engineering.

Henry T. Fernald, Ph.D., ... 44 Amity Street.
Professor of Entomology.

George C. Martin, C.E., Captain 18th U. S. Infantry,
35 North Prospect Street.
Professor of Military Science and Tactics.

Edward A. White, B.Sc., ... Mount Pleasant.
Professor of Floriculture.

---

[1] Absent on leave for second semester.

William R. Hart, A.M., 97 Pleasant Street.
Professor of Agricultural Education.

Fred C. Sears, M.Sc., Mount Pleasant.
Professor of Pomology.

Philip B. Hasbrouck,[1] B.Sc., 130 Pleasant Street.
Associate Professor of Mathematics, Adjunct Professor of Physics and Registrar of the College.

Fred C. Kenney, Mount Pleasant.
Treasurer.

Joseph S. Chamberlain, Ph.D., 6 Kellogg Avenue.
Associate Professor of Chemistry.

S. Francis Howard, M.Sc., 10 Allen Street.
Assistant Professor of Chemistry.

A. Vincent Osmun, M.Sc., North Amherst, Mass.
Assistant Professor of Botany.

Clarence E. Gordon, B.Sc., A.M., North Amherst, Mass.
Assistant Professor of Zoölogy and Curator of the Zoölogical Museum.

Robert Wilson Neal, A.B., A.M., 7 Woodside Avenue.
Assistant Professor of English.

Percy L. Reynolds, M.D., 17 Fearing Street.
Assistant Professor of Physical Education and Hygiene.

William P. B. Lockwood, B.S.Agr., 5 East Pleasant Street.
Assistant Professor of Dairying.

Elmer K. Eyerly, A.M., North Amherst, Mass.
Assistant Professor of Political Science and Lecturer in Rural Sociology.

Frank W. Rane, M.Sc., Boston, Mass.
Lecturer in Forestry.

Robert W. Lyman, B.Sc., LL.B., Northampton, Mass.
Lecturer on Farm Law.

George N. Holcomb, A.B., S.T.B., Montague, Mass.
Lecturer in History.

Sidney B. Haskell, B.Sc., 5 Fearing Street.
Instructor in Agronomy.

Harold F. Tompson,[2] B.Sc., Massachusetts Agricultural College.
Instructor in Market Gardening.

Ray L. Gribben, B.S.Agr., 66 Pleasant Street.
Instructor in Animal Husbandry.

Floyd B. Jenks, B.S.Agr., 97 Pleasant Street.
Instructor in Agricultural Education.

Edgar L. Ashley, A.M., 12 Lincoln Avenue.
Instructor in German.

Anderson Mackimmie, A.B., North Amherst, Mass.
Instructor in French and Spanish.

C. Robert Duncan, B.Sc., 46 Pleasant Street.
Instructor in Mathematics and Physics.

Charles R. Green, B.Agr., Mount Pleasant.
Librarian.

Alexander E. Cance, Ph.D., 9 Fearing Street.
Instructor in Agricultural Economics.

---

[1] Absent on leave; classes taught by Prof. Joseph O. Thompson of Amherst College

[2] Resigned; succeeded at close of first semester by Charles S. Heller.

Frederick B. McKay, A.B., ... 12 Cottage Street.
Instructor in English and Public Speaking.
Harry M. Jennison, B.Sc., ... 66 Pleasant Street.
Assistant in Botany.
John Noyes, B.Sc., ... Wilder Hall.
Assistant in Landscape Gardening.
John N. Summers, B.Sc., ... 66 Pleasant Street.
Assistant in Entomology.

Graduate Assistants.

John R. Parker, B.Sc., ... 96 Pleasant Street.
Assistant in Entomology and Pomology.

Other College Officers.

Edwin H. Forristall, M.Sc., . . Massachusetts Agricultural College.
Farm Superintendent.
Ralph J. Watts, B.Sc., ... 9 Fearing Street.
Secretary to the President.
Charles H. White, B.Sc., ... 84 Pleasant Street.
Field Agent.
Newton Wallace, ... 6 Phillips Street.
Electrician.
Clarence A. Jewett, ... 112 Pleasant Street.
Superintendent of Buildings.
James Whiting, ... Hallock Street.
Foreman, Department of Floriculture.
Burke Hough, ... Massachusetts Agricultural College.
Purchasing Agent.
Miss Mary E. Caldwell, ... Draper Hall.
Bookkeeper, Treasurer's Office.
Miss Clara L. Stuart, ... Draper Hall.
Correspondence Clerk.
Miss Henrietta Webster, ... 79 Pleasant Street.
Clerk, Treasurer's Office.
Miss Gertrude E. Warner, ... Draper Hall.
Stenographer, Division of Agriculture.
Miss Ruth G. Smith, ... North Amherst, Mass.
Clerk to the Dean and the Registrar.
Miss Ola H. Perrin, ... Draper Hall.
Clerk to the Director of Short Courses.
Miss Helen Granger, ... Draper Hall.
Stenographer, Division of Horticulture.

Additional Instructors for the Summer School, 1909.

Edward Avis of New York City, Bird Life.

Additional Instructors for the Winter School, 1910.

F. E. Van Horn, Instructor in Butter Making.
J. W. Wellman, Instructor in the Use of Separators.

OFFICERS OF THE EXPERIMENT STATION.

CHARLES A. GOESSMANN, Ph.D., LL.D., ... Amity Street.
Honorary Director and Expert Consulting Chemist.
WILLIAM P. BROOKS, Ph.D., . . Massachusetts Agricultural College.
Director.
JOSEPH B. LINDSEY, Ph.D., ... 47 Lincoln Avenue.
Vice-Director.
FRED C. KENNEY, ... Mount Pleasant.
Treasurer.
CHARLES R. GREEN, B.Agr., ... Mount Pleasant.
Librarian.

DEPARTMENT OF PLANT AND ANIMAL CHEMISTRY.

JOSEPH B. LINDSEY, Ph.D., ... 47 Lincoln Avenue.
Chemist.
EDWARD B. HOLLAND, M.Sc., ... 28 North Prospect Street.
Associate Chemist, in charge of Research Division.
HENRI D. HASKINS, B.Sc., ... 87 Pleasant Street.
In charge of Fertilizer Division.
PHILIP H. SMITH, B.Sc., ... 102 Main Street.
In charge of Feed and Dairy Division.
ROY F. GASKILL, ... Massachusetts Agricultural College.
Assistant in Animal Nutrition.
LEWELL S. WALKER, B.Sc., ... 19 Phillips Street.
Assistant.
JAMES C. REED, B.Sc., ... 19 Phillips Street.
Assistant.
CARL D. KENNEDY, B.Sc., ... 120 Pleasant Street.
Assistant.
JOSEPH F. MERRILL, B.Sc., ... North Prospect Street.
Assistant.
FRED W. MORSE, Ph.D., ... North Prospect Street.
Assistant Research Chemist.
JOSEPH P. HOWARD, ... North Amherst, Mass.
Collector.
HARRY J. ALLEN, ... Amherst, Mass.
Assistant.

DEPARTMENT OF AGRICULTURE.

WILLIAM P. BROOKS, Ph.D., . . Massachusetts Agricultural College.
Agriculturist.
H. J. FRANKLIN, Ph.D., ... 56 Pleasant Street.
In charge of Cranberry Investigation.

Erwin S. Fulton, B.Sc., ... North Amherst, Mass.
First Assistant Agriculturist.
Edwin F. Gaskill, B.Sc., ... Mr. Goldberg's.
Second Assistant Agriculturist.

Department of Horticulture.

Frank A. Waugh, M.Sc., . . . Massachusetts Agricultural College.
Horticulturist.
Fred C. Sears, M.Sc., ... Mount Pleasant.
Pomologist.
Jacob K. Shaw, M.Sc., ... 1 Allen Street.
Assistant Horticulturist.

Department of Botany and Vegetable Pathology.

George E. Stone, Ph.D., ... Mount Pleasant.
Botanist and Vegetable Pathologist.
George H. Chapman, B.Sc., ... 13 Fearing Street.
Assistant Botanist.

Department of Entomology.

Charles H. Fernald, Ph.D., ... 3 Hallock Street.
Entomologist.
Henry T. Fernald, Ph.D., ... 44 Amity Street.
Associate Entomologist.
John N. Summers, B.Sc., ... 66 Pleasant Street.
Assistant Entomologist.

Department of Veterinary Science.

James B. Paige, B.Sc., ... 42 Lincoln Avenue.
Veterinarian.

Department of Meteorology.

John E. Ostrander, A.M., C.E., ... 35 North Prospect Street.
Meteorologist.
Charles M. Damon, ... Massachusetts Agricultural College.
Observer.

Other Officers of the Experiment Station.

Miss Rose J. Brown, ... Draper Hall.
Secretary to the Director.
Miss Jessie V. Crocker, ... Sunderland, Mass.
Stenographer, Department of Botany and Vegetable Pathology.
Miss Harriet Cobb, ... 33 Cottage Street.
Stenographer, Department of Plant and Animal Chemistry.
Miss Bridie O'Donnell, ... Amherst, Mass.
Stenographer, Department of Entomology.

COMMITTEES OF THE FACULTY.[1]

1909-10.

INSTRUCTION.

Professor MILLS.
  Professor WELLINGTON.
  Professor OSTRANDER.
  Professor SEARS.
  Professor HART.
  Professor FOORD.

ENTRANCE EXAMINATIONS AND ADMISSION.

The REGISTRAR.
  Assistant Professor HOWARD.
  Assistant Professor GORDON.
  Assistant Professor NEAL.
  Mr. MACKIMMIE.

STUDENT ACTIVITIES.

The DEAN.
  Professor STONE.
  Captain MARTIN.
  Professor WHITE.
  Mr. GRIBBEN.

SCHEDULE.

ATHLETICS.

Professor PAIGE.
  Assistant Professor REYNOLDS.
  Assistant Professor GORDON.

GRADUATE SCHOOL.

Professor C. H. FERNALD.
  Professor WELLINGTON.
  Professor STONE.
  Professor SEARS.
  Professor H. T. FERNALD.
  Professor MILLS.

---

[1] The President is ex officio a member of standing committees.

CATALOGUE AND OTHER PUBLICATIONS.

Assistant Professor NEAL.
Assistant Professor OSMUN.
Assistant Professor EYERLY.

LIBRARY.

Professor STONE.
Professor BROOKS.
Professor H. T. FERNALD.

ADVISORY COMMITTEE ON STUDENT LABOR.

The TREASURER.
The DEAN.
The REGISTRAR.

ADVISORY COMMITTEE ON DISCIPLINE.

The DEAN.
The TREASURER.
The REGISTRAR.
The COMMANDANT.

THE COLLEGE.

ADMISSION.

A. Application for Admission.

Correspondence about admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. If an applicant desires a free State scholarship, he must also present to the registrar a certificate of appointment from the State senator of his district. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. Modes of Admission.

Students are admitted to the freshman class either upon *certificate* or upon *examination.* No *diploma* from a secondary school will be considered.

Certificates. — The entrance requirements may be satisfied by certification in any of the following ways: —

1. By presenting certificate from a school approved for such privilege by this college.

2. By presenting certificate from any school approved by the college entrance examination boards.

3. By presenting the customary credentials from the Board of Regents of the State of New York for any of the subjects of the entrance requirements.

Certificates must present at least three of the six required subjects for admission, and not less than seven of the necessary fourteen credits in all. Those subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

Examinations. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. A candidate deficient in both algebra and plane geometry will not be admitted. For the fall of 1910 conditions to the amount of two and one-half units will be allowed; for the fall of 1911 and the following years conditions to the amount of two units will be allowed.[1]

Places of Examination. — Examinations for admission to the college are held as follows: —

In June of each year: in Amherst, in the building of the Department of Mathematics, Massachusetts Agricultural College; in Boston, in the College of Liberal Arts of Boston University, Boylston Street, corner of Exeter; in Worcester, in Horticultural Hall; in Pittsfield, in the City Hall.

In September of each year: in Amherst only, in the building of the Department of Mathematics, Massachusetts Agricultural College.

Time Schedule for Examinations, 1910. — The examinations for entrance in 1910 will be held on the following dates: —

In June, Thursday, June 23, to Saturday, June 25.

In September, Monday, September 12, to Wednesday, September 14.

First Day.

8.15 A.M.	Registration.
8.30 A.M.	Plane geometry.
10.15 A.M.	Chemistry.
11.15 A.M.	Physics.
1.45 P.M.	United States history and civics.
2.45 P.M.	French or German, both required and elective.

Second Day.

8.15 A.M.	English, required and elective.
1.30 P.M.	Algebra.
3.15 P.M.	History, both required and elective.

---

[1] *Entrance with Condition in English.* — Under the rule permitting entrance conditions of not more than two units (in 1910, two and one-half units) of the preparatory subjects, applicants may be admitted, upon examination, with a condition in English under these restrictions: (1) The parts of the preparatory study in English to be valued in entrance units approximately as follows: (*a*) composition, etc., one and one-quarter units; (*b*) reading and study (including interpretation, three-quarters of a unit; see p. 28), one and three quarters units; total, 3 units. (2) The applicant to show, upon examination, satisfactory preparation in work amounting to not less than two units.

The purpose of this provision is to avoid the possible injustice of excluding, without further trial, applicants who appear to be deficient in preparation in only one subject; and the examination will be so set as to permit the estimating of separate credits to carry out this purpose.

Attention is called to the standing rule of the uniform entrance requirement bodies concerning English as an admission subject; namely, that applicants whose work is seriously lacking in correct spelling, punctuation, grammar or other elementary essentials of good usage will be rejected.

Third Day.

8.15 A.M. to 12.15 P.M. In this period, all elective subjects not already scheduled must be taken. Candidates taking these subjects will report at 8.15, and remain in the examination room until all subjects in which they desire examination have been taken. Candidates for examination in either Greek or Latin must, not later than June 1, notify the registrar of their intention to present themselves.

C. REQUIREMENTS FOR ADMISSION.

The requirements for admission are based on the completion of a four-years course in a high school or its equivalent, and are stated in terms of units. The term unit means the equivalent of five recitations a week for a school year. Fourteen units must be offered for admission, of which nine are required and five are elective.

(*a*) The following nine units are required: —

Language.	
English,	3
French or German,	2
History and Civics.	
United States history and civics,	½
History (elective),	1
(*a*) Ancient history.	
(*b*) Medieval and modern history.	
(*c*) English history.	
(*d*) General history.	
Mathematics.	
Algebra, through progressions,	1½
Plane geometry,	1

(*b*) In addition to the requirements under (*a*), five units must be offered from the following-named elective subjects. Not more than four of those subjects in which the credit sought is one-half unit will be accepted.

Language.	
English in addition to requirements,	1
French in addition to requirements,	2 or 1[1]
German in addition to requirements,	2 or 1[1]
Greek,	2 or 3
Latin,	2 or 3

---

[1] If but one elective unit be offered, it must be in the same language as that offered to meet the two-year language requirement.

History.

In addition to requirements,	1 or 2

Mathematics, and Other Sciences.

Solid geometry,	½
Trigonometry,	½
Chemistry,	1
Physiography,	½
Physiology,	½
Agriculture,[1]	½ or 1
Botany,[1]	½ or 1
Geology,[1]	½
Physics,[1]	1
Zoölogy,[1]	½
Commercial geography,[2]	½
Drawing,[2]	½
Manual training,[2]	½ or 1

PRESENTATION OF NOTE-BOOKS.—In specified subjects, the keeping of note-books is required as part of the preparation. If an applicant presents a certificate in any one of these subjects, the certificate must state that the note-book has been satisfactorily prepared, but the note-book itself is not to be submitted; but if the applicant takes an examination, he must submit the note-book itself, at the same time as and as part of the examination; and note-books so presented must themselves be certified by the principal.

D. STATEMENT[3] OF PREPARATION REQUIRED FOR ADMISSION.

In some cases the requirements of the College Entrance Examination Board are here mentioned. A pamphlet containing detailed explanation of these requirements can be had of the Board for 10 cents. Address sub-station 84, New York City.

AGRICULTURE. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade.

BOTANY. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance

---

[1] Note-books required as part of preparation in these subjects; must be presented, properly certified, at examination; must be certified to but not presented in case of admission on certificate.

[2] Certification necessary in these subjects; no examinations given.

[3] In alphabetical order by subjects.

Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half unit or the one unit credit; and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

CHEMISTRY. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements, some of the experiments being quantitative. The keeping of a note-book is required.

COMMERCIAL GEOGRAPHY. — Preparation should be given in a course equivalent to that laid down in Adams's "Commercial Geography," Trotter's "Geography of Commerce," or a similar work.

DRAWING. — Applicants may offer either freehand or mechanical drawing, or both. They must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable them to draw correctly a simple geometric model from memory; or, if they present mechanical drawing, they must have considerable working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented see "Manual Training."

ENGLISH. — Preparation in English should develop in the candidate (1) ability to express himself well and correctly in his mother tongue, and (2) ability to penetrate through language to the meaning that underlies it.

All candidates for admission — whether by examination or by certification — are urged to secure a thorough training in composition, in which at least part of the subjects written on shall be derived from personal observation, experience, or thought. They are urged to cultivate especially, in all their writing, the habit of correctness in spelling, grammar, punctuation, sentence structure and paragraph building. This habit will be of much greater help to them in their English work in the college than will mere knowledge of the prescribed books.

In the examination, direct questions may be put, including questions upon grammar. Several compositions, each about one hundred and fifty words long, will be required, including papers to test the candidate's ability to think and write clearly, either on matters involving personal experience or on topics involving knowledge of the books. All candidates received as members of the freshman class are expected to be able — as a result of their study of the books prescribed "For Study and Practice" — to paraphrase or interpret, with some insight, unfamiliar verse or prose of medium difficulty, in which the meaning does not depend on anything outside the passage itself; and, as part of every examination, at least one passage is given for such interpretation.

The following list of books is made up from the list recommended by the Conference on Uniform Entrance Requirements in English. The examination will be based upon these; but an applicant who has prepared upon other books of the longer list will be examined thereon if he notify the Department of English of his wish before the first day of June preceding the examinations.

For 1910, 1911: —

(*a*) For reading and composition practice: Shakspere's "Merchant of Venice" and "Julius Cæsar;" the "Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography;" Scott's "Ivanhoe;" Hawthorne's "House of the Seven Gables;" Dickens's "A Tale of Two Cities;" Scott's "The Lady of the Lake;" Macaulay's "Lays of Ancient Rome;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur."

(*b*) For detailed study and practice: Shakspere's "Macbeth;" Milton's "Lycidas," "Comus," "L'Allegro" and "Il Penseroso;" Burke's "Speech on Conciliation with America," or Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" Macaulay's "Life of Johnson" or Carlyle's "Essay on Burns."

For 1912: —

(*a*) For reading and composition practice: Shakspere's "As You Like It" and "Julius Cæsar;" Franklin's "Autobiography;" Goldsmith's "The Deserted Village;" Dickens's "A Tale of Two Cities;" George Eliot's "Silas Marner;" Irving's "Sketch Book;" Scott's "The Lady of the Lake;" Byron's "Mazeppa" and "The Prisoner of Chillon;" and Macaulay's "Lays of Ancient Rome."

(*b*) For thorough study and practice: Shakspere's "Macbeth;" Milton's "Comus," "L'Allegro" and "Il Penseroso," or Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Burke's "Speech on Conciliation with America," or Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" Macaulay's "Life of Johnson," or Carlyle's "Essay on Burns."

For 1913, 1914, 1915: —

English Grammar and Composition. — Command of correct and clear English (spoken or written) requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, paragraphs, and the different kinds of whole composition, including letter writing, should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise narration, description and easy exposition and argument based upon simple outlines. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

Literature. — Ability to read with accuracy, intelligence and appreciation is sought through study of books included in two lists, headed respectively reading and study, from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud, and encouraged to commit to memory some of the more notable passages, both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads, and with their place in literary history.

(*a*) Reading: The aim of this course is to foster in the student the habit of intelligent reading, and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from which at least ten units (each unit being set off by semicolons) are to be selected, two from each group: —

I. The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of books XI., XIII., XIV., XV., XVII., XXI.; Virgil's "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any unit of this group a unit from any other group may be substituted.

II. Shakspere's "Merchant of Venice;" "Midsummer Night's Dream;" "As You Like It;" "Twelfth Night;" "Henry the Fifth;" "Julius Cæsar."

III. Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" either Scott's "Ivanhoe" or "Quentin Durward;" Hawthorne's "House of the Seven Gables;" either Dickens's "David Copperfield" or "A Tale of Two Cities;" Thackeray's "Henry Esmond;" Mrs. Gaskell's "Cranford;" George Eliot's "Silas Marner;" Stevenson's "Treasure Island."

IV. Bunyan's "Pilgrim's Progress," Part I.; "The Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography" (condensed); Irving's "Sketch Book," Macaulay's "Essays on Lord Clive" and "Warren Hastings;" Thackeray's "English Humourists;" selections from Lincoln, including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address and the letter to Horace Greeley, along with a brief memoir or estimate; Parkman's "Oregon Trail;" either Thoreau's "Walden," or Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge;" "A Liberal Education" and "A Piece of Chalk;" Stevenson's "Inland Voyage" and "Travels with a Donkey."

V. Palgrave's "Golden Treasury" (first series), books II. and III., with especial attention to Dryden, Collins, Gray, Cowper and Burns; Gray's "Elegy in a Country Churchyard" and Goldsmith's "Deserted Village;" Coleridge's "Ancient Mariner" and Lowell's "Vision of Sir Launfal;" Scott's "Lady of the Lake;" Byron's "Childe Harold," Canto IV., and "Prisoner of Chillon;" Palgrave's "Golden Treasury" (first series), Book IV., with especial attention to Wordsworth, Keats and Shelley; Poe's "Raven," Longfellow's "Courtship of Miles Standish," and Whittier's "Snow Bound;" Macaulay's "Lays of Ancient Rome" and Arnold's "Sohrab and Rustum;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Hervé Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City."

(*b*) Study: This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. For this close reading are provided a play, a group of poems, an oration and an essay, as follows: —

Shakspere's "Macbeth;" Milton's "L'Allegro," "Il Penseroso" and "Comus;" either Burke's "Speech on Conciliation with America," or both Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" either Macaulay's "Life of Johnson," or Carlyle's "Essays on Burns."

Examination.[1] — However accurate in subject-matter, no paper will be deemed satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which may be taken as a preliminary, and the other as a final.

The first part of the examination will be based upon ten units chosen, in accordance with the plan described earlier, from the lists headed reading; and it may include also questions upon grammar and the simpler principles of rhetoric, and short compositions upon topics drawn from the student's general knowledge or experience. On the books prescribed for reading, the form of the examination will usually be the writing of short paragraphs on several topics which the candidate may choose out of a considerable number. These topics will involve such knowledge and appreciation of plot, character-development and other qualities of style and treatment as may be fairly expected of boys and girls. In grammar and rhetoric, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors.

---

[1] Read in connection with this statement the first three paragraphs under "English," pp. 27, 28.

The second part of the examination will include composition and those books comprised in the list headed study. The test in composition will consist of one essay or more, developing a theme through several paragraphs; the subjects will be drawn from the books prescribed for study, from the candidate's other studies and from his personal knowledge and experiences quite apart from reading. For this purpose the examiner will provide several subjects, perhaps five or six, from which the candidate may make his own selections. The test on the books prescribed for study will consist of questions upon their content, form and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their other works, and the periods of literary history to which they belong.

French. — The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a single credit unit in French as an elective subject for entrance, the work described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

Geology. — Grouped with zoölogy, which see.

German. — The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-years requirements).

Third and fourth year German (elective subjects for admission). — For a single credit unit in German as an elective subject for entrance, the work described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

Greek. — Greek will receive credit as an elective requirement upon either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first two books of Xenophon's "Anabasis;" and (*b*) the translation of passages of Attic prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from the first book of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the forms and constructions of the passages.

HISTORY. — Of the one and one-half required units the one-half unit must be offered in United States history and civics, and the one required unit must be offered in either ancient history, medieval and modern history, English history or general history. Either one or two elective units in any one of the historical subjects here named may be offered, provided that such units may not be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on an outline map.

LATIN. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," books I. to IV., or an equivalent, and from Cicero's "Orations against Catiline;" and (*b*) the translation of passages of Latin prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from books I. and II. of Virgil's "Æneid;" and (*b*) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," books I. to IV.

MANUAL TRAINING. — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

MATHEMATICS. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents; the formulas for the *n*th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work should consist of both class-room work and laboratory practice. The work covered in the class room should be equal to that outlined in Hall & Bergen's "Text-book of Physics;" the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present notebooks, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOLOGY. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body: Briefer Course."

ZOÖLOGY, PHYSIOGRAPHY, GEOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis's "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy and geology are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present a note-book, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, and some option will be given the student among questions, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

E. ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. OTHER INFORMATION ABOUT ENTRANCE.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)

2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.

3. Candidates must in 1909 receive credit for at least ten and one-half units; in 1910, for eleven and one-half units; and thereafter for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. No candidate deficient in both algebra and plane geometry will be admitted. For a special provision permitting entrance with a condition in English, see footnote, p. 24.

4. Opportunities for removing entrance conditions are given six weeks after the opening of the college year. If a student fail at that time to clear his record of conditions, he may be given a second opportunity two weeks before the close of the first semester of the freshman year.

5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.

6. Preliminary examinations in part of the subjects required for entrance may be taken one year before entering college.

7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses see "Short Courses."

G. UNCLASSIFIED STUDENTS.

Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

1. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-years high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

2. No applicant under twenty-one years of age will be admitted as an unclassified student.

3. Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

4. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

5. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

6. All unclassified students are subject to the supervision of a special committee.

7. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

8. Unclassified students are subject to the regulations applying to classified students.

COURSES OF INSTRUCTION.

A. TABLE OF UNDERGRADUATE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

FRESHMAN YEAR.

First Semester.

[All work required.]

English,	4
French or German,[1]	4
Algebra,	5
Chemistry,	3
Hygiene,	1
Physical education,[2]	2
Public speaking (at option of instructor),	1
College life (attendance required without credit).	
	19 or 20

Second Semester.

[All work required.]

English,	4
French or German,	4
Geometry and trigonometry,	5
Chemistry,	3
Elementary agriculture,	2
Physical education,	2
Public speaking (if not taken in semester 1),	1
	20 or 21

---

[1] Students may continue in college the language that they present for admission, or they may take the other; but they must continue whichever language they so elect until the end of the first semester of the sophomore year. Eleven college credits are required in this language.

[2] Physical education includes military training.

SOPHOMORE YEAR.

First Semester.

[All work required.]

English,	2
French or German,	3
Agronomy,	3
Zoölogy,	3
Physics,	5
Physical education,	2
	18

Second Semester.

[All courses under "Required," with any two of those under "Elective."]

[Required.]

English,	2
Elementary horticulture,	2
Botany,	4
Agricultural industry,	3
Physical education,	2
	13

[Elective.]

French or German, Animal husbandry, Geology, Physics, Chemistry, Surveying,	each 3 hours. Any two,	6
		19 or 18

JUNIOR AND SENIOR YEARS.

In the junior and in the senior year, work must be taken each semester amounting to not fewer than seventeen nor more than twenty credits.

[Required.]

The following-named subjects are required after the sophomore year, as indicated: —

Physical education, two credits each semester of junior year,	4
Political science (Course 1, Economics),	3
English (any of the elective courses except Literature 15 and 16),	3

[Elective.]

Unless otherwise stated, elective courses are open to both juniors and seniors. Elections are subject to such provisions as either the faculty or the instructors in the courses may declare. In electing courses, students will prepare the statement of their elections strictly in this form: —

For semester one two of 1910–11, I elect these courses, namely: —

No. of Course in Catalogue.	Name of Course in Catalogue.

(Signed) ____________________

Class of 191__.

[Only those courses are here mentioned which are entirely elective; some courses that are open to election by part of the students but are required courses for others are omitted. For such courses, see under the respective department headings the descriptions of "Required Courses."]

Agricultural education, 1, 2, 3, 4, 5, 6.
Agriculture: —
  Agriculture, 3.
  Agronomy, 3, 4, 6, 8.
  Animal husbandry, 2, 3, 4, 5, 6.
  Dairying, 1, 2, 3, 4.
  Farm administration, 3, 4.
Botany, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14.
Chemistry, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 17, 18, 19.
Entomology, 2, 3, 4.
Horticulture: —
  Horticulture, 3, 4, 6, A.
  Pomology, 1, 2, 3, 4.
  Floriculture, 1, 2, 3, 4.
  Landscape gardening, 1, 2, 3, 4, 5, 6.
  Market gardening, 2, 3.
  Drawing, 1, 2.
Humanities: —
  English: —
    English language; journalism, 9, 10, 15, 16, 17.
    Literature, 9, 10, 13, 14, 15, 16, 18.
    Public speaking, 8, 9, 10.
  Modern European languages: —
    French, 6, 7, 8.
    Spanish, 1, 2.
    German, 6, 7, 8.
  Music, 1, 2.
  Political science, 2, 3, 4, 5, 6, 7.
Mathematics, 7, 10; Physics, 6, 9, 15; Engineering, 8, 11, 12, 13, 14.
Military science, 11, 12.

Physical education, 7, 8, 9, 10.
Rural sociology: —
  Agricultural economics, 4, 5, 6, 7, 9, 10.
  Rural sociology, 12.
Veterinary science, 1, 3, 4.
Zoölogy and geology: —
  Zoölogy, 3, 4, 5, 6, 7, 8, 9.
  Geology, 2.

B. UNDERGRADUATE COURSES.

[All courses given in the first semester bear odd numbers; all given in the second semester bear even numbers. Studies are pursued in courses, "course" implying the study given a subject within one semester, without regard to the total number of hours or to the number of credits. Under the heading "Required Courses" are classified all courses that are specifically required of any group of students, although in some cases the same courses are open to other students as electives. The special mention of certain courses as prerequisite to other courses does not imply that no courses but those so mentioned are "preliminary or preparatory" within the meaning of paragraph 9, page 9 of the Rules. Announcements of courses that are not given in 1910–11 are inclosed in brackets.]

Department of Agricultural Education.

Professor HART and Mr. JENKS.

Elective Courses.

1. MEANING OF EDUCATION (PSYCHOLOGY). — A study of the development, structure and function of the nervous system with reference to the sense organs; relation of mind to the nervous system; growth and nature of mental processes; the activities of the mind in the process of learning. Text-book, lectures, discussion, and collateral readings and reports; 3 hours. Credit, 3.
Professor HART.

2. VOCATIONAL EDUCATION (HISTORY AND PHILOSOPHY). — A survey of educational, religious and social movements with reference to their vocational aspects; the growth of educational institutions as influenced by science and industry. Lectures, collateral readings, reports, and a thesis on some phase of industrial education; 3 hours. Credit, 3. Professor HART.

3. METHODS. — A study of mental growth; the theory and practice of teaching; school organization and methods of instruction; the place and function of agriculture in the course of study. Primarily for those who have had Course 1 or 2; 2 hours. Credit, 2. Professor HART.

4. Teachers' Agriculture. — Designed primarily for those who intend to teach; may be taken in connection with Course 3. The work consists of the selection and review of such parts of the courses in agriculture, horticulture and the biological and physical sciences as are adapted to the work of the public schools wishing to introduce agriculture as a subject of study; planning, and practical work in, school gardens; decoration of school grounds; equipment and conduct of playgrounds. One lecture period, 2 two-hour laboratory periods. Credit, 3. Professor Hart and Mr. Jenks.

5. Seminar in Education. — For students who have had courses 1, 2 and 3, or an equivalent. Topics that may be taken up for rather exhaustive study are: legislation and agricultural education, the place and value of agricultural science in school courses, etc. Seniors and graduate students; 2 hours. Credit, 2.
Professor Hart.

6. Seminar in Education. — As stated under Course 5.
Professor Hart.

Division of Agriculture.

Professor Foord, Dr. Brooks, Assistant Professor Lockwood, Mr. Haskell, Mr. Gribben.

Sections.

Agriculture.
Agronomy.
Animal Husbandry.
Dairying.
Farm Administration.

Agriculture.

Required Courses.

2. Elementary Agriculture. — A brief course touching upon the application of science to the common things of the farm. The work of the agricultural experiment stations and its relation to farm practice will be considered. Lectures, text-book and laboratory. Freshmen; 1 laboratory and 1 lecture period. Credit, 2.

Elective Courses.

3. AGRICULTURAL SEMINAR. — A brief survey of current agricultural literature, open to juniors and seniors electing work in the Division of Agriculture. Topics will be assigned and reports required. One hour. Credit, 1. Professor FOORD.

Agronomy.

Required Courses.

1. SOILS AND FERTILIZERS. — A study of the formation, classification and physical and chemical properties of soils. This is followed by study of methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments. Prerequisites, Chemistry 1 and 2. Sophomores; 3 lecture-hours. Credit, 3. Mr. HASKELL.

Elective Courses.

3. FIELD AND FORAGE CROPS. — History, classification, cultivation and harvesting, commercial grading and valuation. The crops studied are the cereal grains, grasses, legumes, forage crops, and those "money crops" of importance in New England. The laboratory work includes the testing of the purity and vitality of the seeds of the different field crops, valuation and judging thereof, and study of the varieties suited to New England conditions. Prerequisites, Agronomy 1 and Botany 2; 2 lectures and 1 laboratory period. Credit, 3. Mr. HASKELL.

4. FIELD CROP IMPROVEMENT. — A study of the influences determining the yield and value of field crops, and of methods of selecting seed and plant with reference to crop improvement. Particular attention is given to the breeding of plants for early maturity, hardiness and disease resistance, so as to fit them to New England conditions. Lectures, laboratory and field work. Prerequisite, Agronomy 3; 1 lecture and 1 laboratory period. Credit, 2.
Mr. HASKELL.

6. ADVANCED SOILS. — Theoretical and practical work on irrigation and drainage; soil survey, with the view of observing the relation between types of soil and its natural vegetation; soil mapping. Lectures, laboratory and library work; 1 lecture and 2 laboratory periods. Prerequisites, Agronomy 1 and Mathematics 8. Credit, 3. Mr. HASKELL.

8. Manures and Fertilizers. — An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Each of the important manures and fertilizers will be discussed, its origin and its chemical and physical characteristics being considered. Each material taken up will be studied in relation to its capacity to supply plant food and to its effects upon soil texture, moisture, temperature and flora. Considerable attention will be devoted to consideration of the experimental work which has been done, and which is now in progress, in manures and fertilizers. Prerequisite, Agronomy 1; 3 lectures a week, with occasional seminars. Credit, 3. Dr. Brooks.

Animal Husbandry.

Elective Courses.

2. Types and Breeds of Farm Animals. — A general introductory course. The development, characteristics and adaptability of the more common breeds of farm live stock. Lectures; Plumb's "Types and Breeds of Farm Animals." Sophomores; 2 lecture periods and 1 laboratory period. Credit, 3. Mr. Gribben.

3. Principles of Live-stock Improvement. — A careful study of the principles of inheritance, and a discussion of methods of improving herds or individual animals, of crossing and grading in the production of market and farm stock. Prerequisite, Course 2; 3 lecture periods; library references. Credit, 3. Mr. Gribben.

4. Dairy Cattle. — Score cards as applied to breed type and their use in scoring for advanced registry; herd book study. One object is to acquaint the student with the various families of the different breeds, their producing powers and external characteristics. The men who will represent the college in judging contests will be chosen from those electing this course, according to the merit of their work. Text-book, lectures and laboratory work; text-book, Craig's "Live Stock Judging." Prerequisite, Course 2; 2 laboratory periods. Credit, 2. Mr. Gribben.

5. Horses, Sheep and Swine. — A course similar to Course 4, but dealing with different classes of stock. Of necessity, the study cannot be so detailed as that made in the preceding course, yet a good working knowledge of the judging of these classes is aimed at.

The course will consist largely of judging practice, with some periods devoted to lectures, covering such topics as unsoundness in horses and the determination of age in domestic animals. Text-book, lectures and laboratory work. Craig's "Live Stock Judging." Prerequisite, Course 2; 2 laboratory periods. Credit, 2.

Mr. Gribben.

6. Feeding and Management of Farm Live Stock. — The principles of nutrition; their relation to stock feeding; the balanced ration; feeding standards; feed stuffs, method of manufacture, economy to the feeder; economical feeding and management of farm animals; feeding for special purposes (as of dairy cows for records and in preparation for public sales or exhibitions). Text-books and lectures; text-books, Henry's "Feeds and Feeding" and Jordan's "Feeding Farm Animals;" experiment station bulletins. Students electing this course are advised to present Chemistry 5 and 6 and register in veterinary science; 3 hours. Credit, 3.

Mr. Gribben.

Dairying.

Elective Courses.

1. Milk and its Composition. — The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; methods in economic milk production; methods for testing herds and developing them to higher efficiency; the study of analysis of milk products by use of the Babcock test for fat, tests for acidity and adulteration, and ordinary preservatives; moisture tests for butter; problems. Must be preceded or accompanied by Animal Husbandry 3; 2 lecture hours and 1 laboratory period. Credit, 3.

Assistant Professor Lockwood.

2. Market Milk. — A study of the market milk conditions, extent and development of the business, supply and delivery; food value of milk and its use as food; milk and its relation to the public health; methods for the proper handling and preparing of milk and cream for direct consumption; certified milk, requirements and production; pasteurizing, sterilizing, standardizing and modifying; milk laws and inspection; a study of bacteriology relative to milk and dairy work. Must be preceded or accompanied by Animal Husbandry 4. Prerequisite, Course 1; 2 lecture hours and 1 laboratory period. Credit, 3. Assistant Professor Lockwood.

3. Butter Making. — A study of hand and factory separators, separator construction and cream separation; handling milk and cream for butter making on the farm and in the factory; preparation of home-made and commercial starters, and ripening cream; churning; recording work; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy-building construction; plans for dairy buildings, arrangement, ventilation, light, sanitation; dairy machinery and care thereof; practical mechanics as applied to the creamery; cement construction as related to dairy construction work. Prerequisites, Courses 1 and 2; 2 lecture hours and 1 laboratory period. Credit, 3.

Assistant Professor Lockwood.

4. Manufactured Milk Products. — Manufacture of other dairy products than butter. Cheddar and fancy cheeses; condensed milks; whey butter, cottage cheese, ice cream, casein, milk powder, etc.; dairying in other countries; library work. Must be preceded or accompanied by Animal Husbandry 6. Prerequisites, Courses 1, 2 and 3; 2 lecture hours and 1 laboratory period. Credit, 3.

Assistant Professor Lockwood.

Farm Administration.

Elective Courses.

3. Farm Equipment. — A study of the material equipment of the farm aside from the land; farm buildings, their location, plan and arrangement; water supply; fencing problems; farm power; farm machinery; wagons. Prerequisite, Mathematics 5; 2 laboratory periods and 1 lecture hour. Credit, 3.

Professor Foord.

4. Farm Management. — The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts. Prerequisites, Agronomy 1 and 3 and Animal Husbandry 2; 2 lecture or recitation hours and 1 seminar period. Credit, 3.

Professor Foord.

Department of Botany.

Professor STONE, Assistant Professor OSMUN, Mr. JENNISON.

[The object of the courses in botany is to teach those topics pertaining to the science which have a bearing upon economic and scientific agriculture. Undergraduate work extending through five semesters is offered. Considerable latitude is allowed students in the senior year in their electives; and, besides the courses here outlined, students often take up the study of histology or of systematic botany, the microscopic examination of pure and adulterated human and cattle foods, spices and drugs, etc. Students sufficiently prepared are occasionally permitted to undertake special physiological and pathological investigations. A botanical conference is held monthly wherein new problems in botanical science are considered by graduate students and the seniors who elect botany.]

Required Courses.

2. HISTOLOGY, PHYSIOLOGY, MORPHOLOGY AND CLASSIFICATION OF PLANTS. — This course is divided into two parts: Part I. extends to the first week in May; Part II. occupies the remainder of the semester. Part I.: Devoted to study of the minute structure and the function of stems, leaves, roots and seeds, and of the chemical composition of plant constituents. The laboratory work consists largely of microscopic study of plant structures, with some time devoted to chemical tests for plant constituents. The lectures aim to amplify and interpret the laboratory work, and to explain the inter-relation of structure and function. Part II.: The laboratory periods are employed in the study of morphology and plant analysis. Lectures are given in morphology, ecology, evolution and taxonomy. Each student is required to collect and prepare an herbarium of 75 species of native plants. Gray's "New Manual of Botany" is used in determining and naming plants. Though only one lecture period is scheduled for this course, it is understood that laboratory hours may be used for lectures at the discretion of the instructor. Sophomores; 3 two-hour laboratory periods and 1 lecture hour. Credit, 4.

Assistant Professor OSMUN and Mr. JENNISON.

Elective Courses.[1]

3. CRYPTOGAMIC BOTANY. — Systematic study of typical forms of the lower plants (bacteria, algæ, fungi, lichens, mosses and ferns); instruction in laboratory technique and methods, and the making of herbaria of lichens, mosses and ferns. Laboratory work and lectures; field excursions for the purpose of observing environmental habits and collecting material for laboratory study; col-

---

[1] Students electing any of the junior work may take botany in their senior year, and those specializing in chemistry may take plant physiology in their senior year without having had the junior work in botany.

lateral reading. This course is intended for those students who wish to specialize in biology; its purpose is to afford more thorough scientific training than is offered in Course 5, and students electing this course will attend the lectures in Course 5. Juniors; 3 two-hour laboratory periods and 1 lecture hour. Credit, 4.

Assistant Professor OSMUN.

4. CRYPTOGAMIC BOTANY. — This is a continuation of Course 3. Prerequisite, Course 3. Juniors; 1 two-hour laboratory period and 1 lecture hour. Credit, 2. Assistant Professor OSMUN.

5. PLANT PATHOLOGY. — This course comprises a study of the common diseases of crops and consideration of the methods for their prevention and control, and is intended especially for students in horticulture and agriculture. Laboratory work and lectures. The work in pathology is preceded by a brief study of the lower cryptogams. Juniors; 1 two-hour laboratory and 1 one-hour lecture period. Credit, 2.

Professor STONE, Assistant Professor OSMUN and Mr. JENNISON.

7. PLANT PATHOLOGY. — This course includes a study of the diseases of one or more crops and the methods of controlling them. Laboratory work and lectures, together with extensive reading of experiment station literature. The course is intended for those who wish to become more familiar with the diseases of one or more groups of economic plants. Seniors; those students continuing in botany must take Course 8; 3 three-hour laboratory periods and 1 lecture period. Credit, 5. Professor STONE.

8. PLANT PATHOLOGY. — As stated in Course 7. Prerequisite, Course 7. Professor STONE.

9. ECONOMIC FUNGI. — This course comprises the study of economic fungi from a taxonomic point of view, and is intended for those who wish a more comprehensive knowledge of the phylogenetic relationships of fungi. Laboratory work and lectures. Tubeuf & Smith's "Diseases of Plants" is used as a guide, with special monographs on fungi and with the more important experiment station literature treating of the life history of fungi. Seniors; must be followed by Course 10; 2 or 3 three-hour laboratory periods and 1 one-hour lecture period. Credit, 4 or 5.

Professor STONE.

10. Economic Fungi. — As stated in Course 9. Prerequisite, Course 9. Professor Stone.

11. Plant Physiology. — This course is largely experimental, and is especially adapted to the needs of students who are taking chemistry. Laboratory work and lectures; various handbooks on plant physiology. Seniors; must be followed by Course 12; 3 three-hour laboratory periods and 1 one-hour lecture period. Credit, 5. Professor Stone.

12. Plant Physiology. — As stated in Course 11. Prerequisite, Course 11. Professor Stone.

13. Physiology and Pathology of Shade Trees. — This course includes a comprehensive study of the diseases, structure and functions of trees and shrubs, and of every agency which in any way affects shade trees. Laboratory work and lectures; extensive reference reading. Designed for those students who intend to take charge of parks or large estates, or to become tree wardens, city foresters, landscape gardeners or professional advisers and caretakers. Seniors; must be followed by Course 14; 2 three-hour laboratory periods and 1 one-hour lecture period. Credit, 4. Professor Stone.

14. Physiology and Pathology of Shade Trees. — As stated in Course 13. Prerequisite, Course 13. Professor Stone.

Department of General and Agricultural Chemistry.

Professor Wellington, Associate Professor Chamberlain, Assistant Professor Howard.

[The courses in chemistry aim to teach accurate observation, logical thinking and systematic and constant industry, together with a comprehensive knowledge of the subjects presented. Instruction is given through text-books, lectures and a large amount of laboratory work under supervision. The laboratory work at first consists of the study of the properties of elementary matter, the analysis of simple combinations, and their artificial preparation. This is followed by the quantitative analysis of salts, minerals, soils, fertilizers, and the chemistry of various manufacturing industries, especially those of agricultural interest, such as are concerned in the production of sugar, starch and dairy products; the preparation of animal and plant foods, their digestion, assimilation and economic use; and the official analysis of soils, insecticides, fungicides, waters, milk, wine, and other animal and vegetable products.]

Required Courses.

1. THE NON-METALS. — An introduction to chemical laws. The commoner non-metallic elements, their occurrence in nature, and their uses in the arts, are studied. Lectures and laboratory exercises. Freshmen; 4 hours. Credit, 3.

Assistant Professor HOWARD.

2. THE COMMON METALS. — This course extends the study of Course 1 to the metals common in the arts, and includes blowpipe analysis and elementary determinative mineralogy. Lectures, recitations and laboratory exercises. Prerequisite, Course 1. Freshmen; 4 hours. Credit, 3.

Assistant Professor HOWARD.

Elective Courses.

4. QUALITATIVE ANALYSIS. — A course in the systematic analysis of the important metals and acids and their salts. Students electing advanced courses in chemistry should take this course. Lectures and laboratory work; Treadwell-Hall's "Analytical Chemistry." Prerequisite, Course 2. Sophomores; 6 hours. Credit, 3.

Assistant Professor HOWARD.

5. ORGANIC CHEMISTRY. — This course, with Course 6, continues, through the junior year. The two courses are designed especially: (1) for those who are looking forward to positions as chemists in agricultural colleges or experiment stations, the United States Department of Agriculture, or similar places, and who need a knowledge of chemistry for itself; and (2) for those who are expecting to enter like positions in other sciences, and who will use their knowledge of chemistry in a secondary way. It consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry; and forms a foundation for courses in physiological chemistry and agricultural analysis, and thus for possible future work in agricultural chemical investigation. Prerequisites, Courses 1, 2 and 4. Those electing Course 5 are expected to elect Course 6. Juniors; lectures, 3 hours; laboratory, 4 hours. Credit, 5.

Associate Professor CHAMBERLAIN.

6. — As stated under Course 5.

Associate Professor CHAMBERLAIN.

7. AGRICULTURAL CHEMISTRY. — A course continuing through the two semesters of the junior year. This course and Course 8 are designed as an alternative for Courses 5 and 6. They are especially intended for those who, having completed Courses 1 and 2, do not care to continue the study of chemistry for itself, but who are planning to enter practical agricultural work and desire a somewhat further knowledge of chemistry as it is related directly to agriculture and agricultural problems. The work is planned in two parts, viz., *Course 7, Inorganic Agricultural Chemistry,* the study of the general composition, properties and reactions of soils and fertilizers, and in addition to this the study of some of the common materials of construction, such as tile, brick, cements, paints, oils, etc.; and *Course 8, Organic Agricultural Chemistry,* the study of plants and animals as to composition, nutritive value and general processes of nutrition and growth, and also the study of products manufactured from them, such as milk, butter, sugar, maple syrup, denatured alcohol, wood pulp, paper, etc. The treatment of the subject in both of these courses is entirely general, avoiding all complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the chemical aspect of agricultural processes and products. Prerequisites, Courses 1 and 2. Juniors; those electing Course 7 are expected to elect Course 8; lectures, 3 hours. Credit, 3.

Associate Professor CHAMBERLAIN.

8. — As stated under Course 7.

Associate Professor CHAMBERLAIN.

9. QUANTITATIVE ANALYSIS. — A course continuing through the two semesters of the junior year; for those who wish to acquire skill in chemical analysis. Students intending to enter experiment station or chemical-control work have here an opportunity to become familiar with the reactions and processes concerned. Prerequisite, Course 4. Juniors; those electing Course 9 are expected to elect Course 10; lectures, 1 hour; laboratory, 9 hours. Credit, 5.

Professor WELLINGTON.

10. — As stated under Course 9. Professor WELLINGTON.

11. ADVANCED GENERAL CHEMISTRY. — This course makes a more thorough study of the physical laws and typical reactions than is made in Courses 1 and 2. For all students intending to

specialize in chemistry this course is required. Prerequisite, Course 4. Lectures, 1 hour; laboratory, 4 hours. Credit, 3.

Assistant Professor HOWARD.

13. PHYSIOLOGICAL CHEMISTRY, VEGETABLE. — This course and Course 14 are intended to be supplementary to Courses 5 and 6 and Courses 7 and 8. To those who expect to take up scientific work, and who have had Courses 5 and 6, Course 13 will give acquaintance with the chemistry of the physiological processes in plants, and the action of physiological substances. Together with Course 14, it gives additional training in the chemical problems of agricultural experiment station work, and it will, with the courses in analytical chemistry, fit men for such work. To those who will not take up scientific lines of work, but will follow practical agriculture, it will give additional knowledge of the facts and processes with which they will meet. It will consider more exactly and in greater detail the chemical and physiological aspect of problems which were treated generally in Courses 7 and 8. Prerequisites, Courses 5 and 6, or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor CHAMBERLAIN.

14. PHYSIOLOGICAL CHEMISTRY, ANIMAL. — A continuation, or counterpart, of Course 13, but dealing with animals. Prerequisites, Courses 5 and 6, or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3. Associate Professor CHAMBERLAIN.

15. CHEMICAL PROBLEMS. — A course in the historical progress of agricultural chemistry. The inception and growth of modern knowledge in agricultural chemistry will be intimately studied for the purpose of familiarizing the student with the experimental work and the logical processes of the more notable achievements in this department of chemistry. The course includes work in the biography and literature of research, as well as general chemical history. The classic works of Liebig, Wöhler, Liebermann, Baeyer, Gilbert, Henneberg, Tollens, Fischer and others will be taken up. In the light of the studies made, present-day problems in agricultural chemistry will be examined and methods for their solution tried. Prerequisites, Courses 5 and 6, 9 and 10, 11, 13, 14. Open to students only by permission; lectures, reading and laboratory work; 1 lecture and 4 laboratory periods. Credit, 5.

Professor WELLINGTON.

17. Chemical Practice in Agriculture. — This course and Course 18 are divided into subcourses as follows: —

A. Analysis of Fertilizers, Insecticides and Fungicides. — The theory, with a large amount of practice in this subject, is given under the close supervision of a teacher. The methods followed are in the first place comparative. Then the preferred official methods are intimately studied, especially with reference to their limitations. The students are impressed with the fact that, even at this late day, all of these methods require revision, and are only awaiting the clear head of the learned man and the expert technician for their improvement. Prerequisite, Course 4. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5.

B. Analysis of Foods and Fodders. — This course is pursued in a method uniform with that of Course 17*A*. Both courses are intended to fit men for experiment station and control work, as well as for research efficiency. The latest results of alimentation, physiology and the composition of foods and condiments are studied. The students will be urged to make inquiry for themselves in the fields of study. Prerequisites, Courses 5 and 6, 9 and 10, 13; corequisite, Course 14; lecture 1 hour, laboratory 9 hours. Credit, 5.

C. Chemistry of Sugar Making and Refining. — In this course, after the chemical character of sugar and its function as a food have been determined, the theory and practice of the subjects named will be intimately studied. This involves practice in the analysis of many common chemicals, minerals and manufactured products, such as limestone, coal, boneblack, sulphites, clays, etc. The behavior of sugars and allied substances toward light, qualitatively and quantitatively, is investigated. The students are fitted for service in sugar houses and sugar refineries. Prerequisite, Courses 5 and 6; lectures 1 hour, laboratory 9 hours. Credit, 5.

D. Dairy Chemistry. — This course takes up instruction in the various processes of dairy chemistry, including chiefly the analysis of foods for dairy animals and the dairy products. Given in alternate years; given in 1910–11. Open only on permission; lectures 1 hour, laboratory 6 hours. Credit, 3. Professor Wellington.

18. Chemical Practice in Agriculture. — As stated under Course 17. Professor Wellington.

19. Sanitary Chemistry. — This course is planned to bring into striking and intimate relationships many hitherto missing facts between the science of the lecture room and laboratory and the

actual practice of living as it is pursued in every condition in which a person finds himself between birth and death. It is hoped that this course will impart to every one who takes it new conceptions of the functions and duties of practical life. It is believed that, through carefully and minutely demonstrated experiments, this end will be attained. Given in alternate years; not given in 1910–11. Open only on permission; lectures 2 hours. Credit, 2.

Professor WELLINGTON.

Department of Entomology.

Prof. C. H. FERNALD, Prof. H. T. FERNALD, Mr. SUMMERS.

[A knowledge of insects is of importance in every department of life, and particularly in connection with agriculture, horticulture, biology, landscape gardening and forestry; it therefore forms part of a general education. An introductory course in this subject is accordingly offered in the junior year. For those who desire a further knowledge of the subject, because of its importance to their future occupation, a senior course is also offered, so arranged as to be of especial value for those who expect to take up agriculture, horticulture, landscape gardening, forestry or science teaching.]

Elective Courses.

2. GENERAL AND ECONOMIC ENTOMOLOGY. — This course comprises studies in the structure of insects as applied to their identification, and in the principles of classification; a systematic examination of the different groups and of the most important economic insects of each group, including their life histories and habits, recognition of their work as shown in the collection and in the field, and methods for their control. The most important insecticides, and their preparation and application with different kinds of apparatus, are also treated. Field work in collecting insects is a part of the course; and this is accompanied by laboratory work on methods of pinning, pressing and mounting insects, and of classifying them. Juniors; 4 one-hour lecture periods till about May 1; thereafter 1 one-hour lecture period and 3 two-hour laboratory or field periods. Credit, 4. Prof. H. T. FERNALD.

3. ADVANCED ENTOMOLOGY. — This course is subdivided according to the particular needs of those taking it, and is to a large degree given in the form of individual instruction.

A. Morphology. — Careful studies of the structure of insects belonging to each of the larger and more important orders, together with lectures on the subject, followed by the identification of insects of each of these groups and the study of the collections, to teach the use of the analytical tables and of structural characters in the determination of insects.

B. Histology. — Lectures on the internal anatomy and the histology of the various organs, with particular reference to those affected by the various insecticides.

C. Insecticides and Apparatus. — Lectures on the chemistry, preparation and application of the different insecticides, their merits and defects, tests for detecting adulterations; and a study of other methods of insect control, together with laboratory work on adulterated materials.

D. Coccidology. — Laboratory work on methods of preserving, mounting and identifying scale insects, particular attention being given to those of greatest economic importance.

E. Bibliography. — Studies of the various sources of entomological publications and of the methods of finding the literature on any insect.

F. Special Studies. — In these studies the insects most closely related to the future occupation of the student will receive attention.

The results of these studies are brought together in the form of an essay or thesis; this will include all the essentials of what is known of the structure, life history, habits and injuries caused by each insect studied, together with methods of treatment, and a list of the best articles found in the course of the work. Comstock's "Manual for the Study of Insects" is used in the laboratory work. Seniors; prerequisite, Entomology 2; students electing 3 must also take 4; 1 one-hour lecture period and 3 two-hour laboratory or field periods. Credit, 4.

Profs. C. H. FERNALD and H. T. FERNALD and Mr. SUMMERS.

4. ADVANCED ENTOMOLOGY. — As stated in Course 3. Prerequisite, Course 3.

Profs. C. H. FERNALD and H. T. FERNALD and Mr. SUMMERS.

DIVISION OF HORTICULTURE.

Professor WAUGH,[1] Professor SEARS, Assistant Professor WHITE, Mr. TOMPSON,[2] Mr. HELLER, Mr. RANE, Mr. NOYES.

DEPARTMENTS.

Horticulture.
Pomology.
Floriculture.
Landscape Gardening.
Market Gardening (Section).
Drawing (Section).

---

[1] Absent on leave.

[2] Resigned; succeeded by Mr. Heller at beginning of semester two.

Department of Horticulture.

[The general subject of horticulture divides naturally into the subjects of pomology, floriculture, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore here grouped under the general designation of horticulture.]

Required Courses.

2. NURSERY PRACTICE. — This course treats of the fundamental operations of horticulture — propagation, pruning, cultivation — as related to the physiology of the plant. Lectures and practicums; Bailey's "Nursery Book" as text in propagation. Sophomores; 2 hours. Credit, 2. Professor SEARS.

Elective Courses.

3. PLANT MATERIALS. — This course aims to make the students familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them. Prerequisite, Horticulture 2; 2 lecture periods and 1 laboratory period. Credit, 3. Professor WHITE.

4. PLANT MATERIALS. — A continuation of Course 3, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions. Perequisite, Horticulture 3; 2 lecture periods and 1 free afternoon. Credit, 3. Professor WHITE.

6. PLANT BREEDING. — This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops. Seniors and graduates; open only to students well prepared in agricultural or horticultural subjects; 2 lecture periods and 1 two-hour laboratory period. Credit, 3.

A. Forestry. — Courses in forestry cannot be definitely announced at the date of issue of this catalogue. After Sept. 1, 1910, a schedule of courses in forestry will be sent on application to prospective students. This schedule will be announced by personal letter to present students on or before September 1.

Department of Pomology.

Elective Courses.

1. PRACTICAL POMOLOGY. — *General.* — A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of stock, pruning, spraying, etc. Text and reference books; field and laboratory exercises. Prerequisite, Horticulture 2. Juniors; 5 hours. Credit, 3. Professor SEARS.

2. PRACTICAL POMOLOGY. — *Special.* — The special application of the general principles discussed in Course 1 to the culture of the principal kinds of fruits, such as apples, pears, peaches, plums, cherries and quinces; grape culture and the culture of small fruits, such as blackberries, raspberries, currants, gooseberries and strawberries. Text-books, lectures and reference books; field and laboratory exercises. Prerequisites, Horticulture 2 and Pomology 1. Juniors; 5 hours. Credit, 3. Professor SEARS.

3. SYSTEMATIC POMOLOGY. — A study of the varieties of the different fruits and of nomenclature and the identification of varieties, with critical descriptions and special reference to relationships and classifications. Text-books, laboratory and field exercises. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 5 hours. Credit, 3. Professor SEARS.

4. COMMERCIAL POMOLOGY. — The storing and marketing of fruits; includes a discussion of storage houses, the handling and storing of fruits, fruit packages, methods of grading and packing, etc. Text and reference books; laboratory exercises. Seniors; prerequisites, Horticulture 2, Pomology 1, 2 and 3; 5 hours. Credit, 3. Professor SEARS.

Department of Floriculture.

Elective Courses.

1. Greenhouse Management. — This course is designed to familiarize students with methods followed in the management of greenhouse crops. The students are instructed in the practical operation of greenhouse watering, fumigating and ventilating, in the care of furnaces, and in the methods of propagation of greenhouse plants by seeds, cuttings, budding and grafting. This is designed as a laboratory course, and students electing it will be expected to arrange their hours according to the needs of the work. Prerequisite, Horticulture 2. Juniors; 7 hours a week. Credit, 4.
Professor White.

2. Greenhouse Design and Construction. — A study of the location, arrangement and construction of greenhouses; the drawing of plans for commercial and private ranges, to show foundations and details in construction of superstructure; arrangement of heating pipes; estimates of comparative cost of different methods of construction; drafting specifications. Juniors; prerequisite. Floriculture 1; 7 hours. Credit, 4. Professor White.

3. Fall Greenhouse Crops. — A study of important fall and winter crops and their care, — chrysanthemums, carnations, violets, roses, palms, and the like; the importation, purchase and growth of bulbous material; the preparation of material for forcing; design making; house and church decorating. Lectures, text-books and laboratory exercises. Prerequisites, Floriculture 1 and 2. Seniors; 5 hours. Credit, 3. Professor White.

4. Spring Greenhouse Crops. — The culture of individual crops in their relation to spring work in a florist establishment. A critical study of methods of propagating bedding plants, the nature and use of these plants, practice in planting them and in the spring care of herbaceous perennials and wholesale and retail marketing of spring plants. Lectures, text-books and practical exercises. Seniors; prerequisites, Floriculture 1, 2 and 3; 5 hours. Credit, 3.
Professor White.

Department of Landscape Gardening.

Elective Courses.

1. ELEMENTS OF LANDSCAPE GARDENING. — Reconnoissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected works of leading landscape gardeners; grade design, road design and field work. Students should have preparation in surveying, mathematics, plant materials and drawing. Must be followed by Course 2. Juniors; 7 hours a week. Credit, 4. Mr. NOYES.

2. ELEMENTS OF LANDSCAPE GARDENING. — As stated under Course 1. Prerequisite, Course 1. Mr. NOYES.

3. GENERAL LANDSCAPE GARDENING. — Field notes; examination of completed works and those under construction; design of architectural details; planting plans; estimates; written reports of individual problems. Seniors; prerequisites, Landscape Gardening 1 and 2, and either plant materials (Horticulture 3 and 4) or advanced mathematics; must be followed by Course 4; 7 hours. Credit, 4. Professor WAUGH and Mr. NOYES.

4. GENERAL LANDSCAPE GARDENING. — As stated under Course 3. Prerequisite, Course 3.

Professor WAUGH and Mr. NOYES.

5. THEORY OF LANDSCAPE ART. — The general theory and applications of landscape study, including a brief history of the art. Seniors and graduates; 2 hours. Credit, 2.

Professor WAUGH.

6. ORNAMENTAL GARDENING. — An elementary course for students who take no other work in landscape gardening. The general principles and their simpler applications, such as the ornamental planting of farm yards, school grounds and streets, the care of estates, etc. Text-book, Waugh's "Landscape Gardening;" 3 hours. Credit, 3. Mr. NOYES.

Market Gardening.

Elective Courses.

2. Elements of Market Gardening. — A study of market gardening as a business, with detailed consideration of the conditions under which it is practiced. The problems of soil selection and soil management, garden fertilization and tillage, receive attention from the viewpoint of the market gardener, and considerable time is devoted to the study of garden crops. Juniors; prerequisite, Horticulture 2; 3 hours. Credit, 3. Mr. Heller.

3. Advanced Market Gardening. — A continuation of the work begun in Market Gardening 2, taking up problems of harvesting, storing and marketing; and making a thorough study of the greenhouse vegetable industry, and of the trucking business of the south with special reference to its effect on northern greenhouse vegetable growing. Some time is devoted to a study of the special forced crops, and an opportunity given to become familiar with the new and little known vegetables. Collateral reading required. Floriculture 2 must be taken in connection with this course. Seniors: prerequisite, Market Gardening 2; 5 hours. Credit, 3. Mr. Heller.

Drawing.

Elective Courses.

1. Freehand Drawing. — Lettering; sketching from type models, leaves, fruits, vegetables, flowers and trees, insects and small animals; laying flat and graded washes in water colors; water-color rendering of fruits, vegetables, leaves, flowers and trees; topographical lettering and conventional signs in ink; conventional coloring; mapping in ink and in water colors. (Was not given in 1909–10.) Juniors; 6 hours. Credit, 3. Mr. Noyes.

2. Mechanical Drawing. — Inking exercises; geometric problems; projection; intersections; isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Juniors; 6 hours. Credit, 3. Mr. Noyes.

DIVISION OF THE HUMANITIES.

Professor MILLS, Assistant Professor NEAL, Assistant Professor EYERLY, Mr. HOLCOMB, Mr. MACKIMMIE, Mr. ASHLEY, Mr. GREEN, Mr. MCKAY.

DEPARTMENTS.

English.
Modern European Languages.
Music (Section).
Political Science.
Library.

[The Language Conference consists of the instructors in the departments of English and Modern European Languages, and the students enrolled in elective courses in these departments. Student attendance at the meetings is required.]

Department of English.

English Language; Journalism.
Literature.
Public Speaking.

ENGLISH LANGUAGE.

Required Courses.

1. FRESHMAN ENGLISH. — Composition; introduction to literature. Recitations and lectures; theme writing; conferences.[1] Freshmen; 5 hours. Credit, 5.
Assistant Professor NEAL and Mr. MCKAY.

2. FRESHMAN ENGLISH. — As stated under Course 1. Prerequisite, Course 1; 4 hours. Credit, 4.
Assistant Professor NEAL and Mr. MCKAY.

3. SOPHOMORE ENGLISH.[2] — Composition; literature. Prerequisite, Course 2; sophomores; 2 hours. Credit, 2.
Assistant Professor NEAL.

4. SOPHOMORE ENGLISH.[2] — As stated under Course 3. Prerequisite, Course 3. Assistant Professor NEAL.

---

[1] Student assistants, 1909-10: Samuel Weis Mendum, '10; Josiah Chase Folsom, '10; William Clarence Johnson, '10; Herbert Jonathan Baker, '11; Edgar Morton Brown, '11; Leonard Matthews Johnson, '11; Henry Alvan Brooks, '10 (first semester); Edward Harrison Turner, '10 (first semester); Bernhard Ostrolenk, '11 (second semester).

[2] Students whose work in Courses 1 and 2 reaches a standard satisfactory to the Department may be excused from not more than half of the sophomore work in English. At present, students in Course 3 or Course 4 are permitted, under restrictions to be stated by the Department, to substitute Public Speaking for English Language and Literature.

7. TRAINING COURSE. — A course (*a*) required of student assistants in English, and (*b*) open (with the instructor's consent) to candidates for a tutorship. Candidates are expected to take it in qualifying for appointment. The course may be taken for either sophomore or elective credit. Two hours. Credit, 2.
Assistant Professor NEAL.

8. TRAINING COURSE. — As outlined under Course 5.
Assistant Professor NEAL.

A. Use of Library. — Five lectures on the use of the Library. Hours to be appointed. Required of all sophomores in the first semester. Mr. GREEN.

[Enrolment in the elective courses in the Department of English is subject to the approval of the instructor. The membership in several of the courses is strictly limited; hence students are advised to plan their work well in advance in order to be sure of completing the required three hours of post-sophomore English. This credit must be made up without taking Literature 15 or 16. In each semester, the students enrolled in elective courses in English are expected to take part in the meetings of the Language Conference.]

ENGLISH LANGUAGE; JOURNALISM.

Elective Courses.

9. JOURNALISM.[1] — Under the title "Journalism" are grouped agricultural journalism, newspaper and periodical writing and a somewhat more advanced study of journals and journalistic writing. All these courses are closely related. In the beginning, Courses 9*A* and 9*B* are identical; the introductory work in Course 9*B* — such as desk editing, proof reading, and especially the writing of news stories in simple reporting style — being deemed necessary as training preparatory to any kind of journalistic work. The chief differences between Course 9*A* and Course 9*B* are, (1) that Course 9*A* opens more immediate opportunities for practical work, as publication for a limited amount of the student writing is found in agricultural periodicals; and (2) that Course 9*B* opens the way for more varied observation and investigation, and for more varied experience in writing, contributing in these ways to general culture, as Course 9*A* contributes to specialized training.

---

[1] The attention of students who elect courses in Journalism is specially directed to the courses given in the collateral subjects here mentioned: Agricultural Education, especially Courses 1 (Psychology) and 2. French, especially Courses 3-4, 5-6, 7-8. German, especially Courses 3-4, 5-6, 7-8. Spanish. Political Science, 1, 2, 3, 4, 5, 6, 7. Rural Social Science, 2, 4, 5, 6, 7, 9-10, 12, 14. English Language and Literature. Public Speaking. By judicious election among the scientific courses and among courses in the subjects named above, a student wishing to follow either agricultural or general journalism can broadly and effectively prepare himself for the profession.

A. Agricultural Journalism. — The production of "copy" adapted to the use of agricultural periodicals. The class, organized as an editorial staff, is charged with the preparation of an agricultural periodical. Two hours. Credit, 2.

B. Newspaper and Periodical Writing. — The elements of journalism — newspaper and magazine writing, reporting, editing, printing, etc. The class, organized as an editorial staff, is to issue a periodical. It is responsible for "covering" events, desk editing, copy and proof reading, making "dummies" and writing legends for illustrations, completing "forms" and "publishing" the periodical upon schedule time, etc. The first semester will be devoted principally to newspaper writing; the second semester to periodical writing. Two hours. Credit, 2.

C. Proseminar in Journalism. — Informal, beginning with a study by individual students of editorial writing and of types of magazine writing, such as "descriptive" articles, research articles, "human interest" articles, and articles in "popularized" science. Members of the class are expected to formulate through these studies theories of journalism and journalistic writing, to state them in thesis form, and to produce articles of the kinds studied. Reference reading and reports upon current periodicals may be called for. Prerequisite, a credit of not less than 2 hours in journalism; more being advised. One hour. Credit, 1.

9*A* and 9*B* may be taken at the same time; so — under restrictions stated in *C* — may 9*A* and 9*C* or 9*B* and 9*C*.

Assistant Professor NEAL.

10. JOURNALISM. — As stated under Course 9.

Assistant Professor NEAL.

15. ENGLISH LANGUAGE. — See Literature 15.

16. ENGLISH LANGUAGE. — See Literature 16.

17. ADVANCED COMPOSITION. — A course varying in plan, but usually concerned with some form of exposition, description or narration. Offered in 1910–11 if applied for. Two hours. Credit, 2.

Assistant Professor NEAL.

LITERATURE.

Required Courses.

1, 2, 3, 4, 7 and 8. — See the courses so numbered under "English Language."

Elective Courses.

9. Cultural Reading. — An individual reading course intended to encourage broader acquaintance with literature, art, philosophy (including psychology), or history (including political and social science). Students must, when enrolling, present in writing a detailed statement of the reading they purpose to do. The reading must be sufficient to require forty-five hours; must be strictly non-technical; may be in any of the subjects indicated above; must not consist in research; and may — subject to its purpose — be taken in any department by arrangement between the student and the instructor in the department concerned. If the reading be taken outside the Department of English, the student must, before presenting his outline of reading, secure in writing the endorsement thereof by the instructor under whom he is to read. Each student must prepare a two-thousand-word paper upon his reading, and this paper must be presented by the fourth Wednesday before the beginning of senior examinations. It must be accompanied with a written statement from the supervising instructor that the reading as outlined has been satisfactorily completed, and with a grade from him upon the subject-matter. Prerequisite, the sophomore courses in English; total credits allowed to one student for cultural reading work, 2. Credit, 1. Assistant Professor Neal.

10. Cultural Reading. — As stated under Course 7.
Assistant Professor Neal.

13. Literary History. — A course dealing with some period of literary history; in 1909–10, Elizabethan literature was studied. Lectures, text-book or reference assignments, or class-room interpretation of authors; much outside reading; written studies upon announcement. Given upon application. Prerequisite, the sophomore courses in English. Two hours. Credit, 2.
Assistant Professor Neal.

14. Literary History. — As outlined under Course 11.
Assistant Professor Neal.

15. English Language and Literature. — The origin, history and development of the English language; essayists and novelists of the nineteenth century. Continuous with Course 16. Not given in 1909–10. Seniors; 3 hours. Credit, 3.
Professor Mills.

16. English Language and Literature. — Continuous with Course 15. The elements of literary criticism; nineteenth century poets. Not given in 1909–10. Seniors; 3 hours. Credit, 3.
Professor Mills.

18. Advanced Literary Study. — This course varies from year to year. It will usually provide opportunity either for intensive study of great writers or for study of the historical development or the structure and characteristics of literary types. Prerequisite, the sophomore courses in English; but those students who have taken or are taking courses in literary history or general reading will be the better prepared to take Course 18 with profit. In 1909–10, Shakspere; in 1910–11, the English novel. — Shakspere: The interpretation of two plays in class and the reading of two others outside; the life of Shakspere; collateral reading. Tests and examinations. Two hours, with a third hour at the option of the instructor. Credit, 2. Assistant Professor Neal.

Public Speaking.

Required Courses.

1. Freshman Public Speaking. — Freshman public speaking is required in either the first or the second semester, at the option of the instructor. Vocal exercises; practice in the delivery of declamations and interpretive readings. Freshmen; 1 hour. Credit, 1. Mr. McKay.

2. Freshman Public Speaking. — As stated under Course 1. Required of all freshmen who are not assigned to take Course 1.
Mr. McKay.

3. Sophomore Public Speaking. — Original speeches on assigned topics and declamations, supplemented by exercises in voice development and gesture. Elective within the English Department, as stated under English Language 3. Prerequisite, Course 1 or 2, or its equivalent. Sophomores; 1 hour. Credit, 1.
Mr. McKay.

4. Sophomore Public Speaking. — Work of the same character as in Course 3, but more advanced. When conditions justify, special sections are formed in debating and interpretive reading. Elective within the English Department, as stated under English Language 3. Prerequisite, Course 3. Sophomores; 1 hour. Credit, 1. Mr. McKay.

Elective Courses.

8. ORATORY. — Study of great orators; prescribed reading; speeches on assigned topics; the preparation and delivery of an oration, supplemented by a study of the principles of oratorical composition and delivery. It is especially recommended for those who desire to enter the Flint contest. Prerequisite, Course 3; 1 hour. Credit, 1. MR. MCKAY.

9. DEBATING. — Considerable time is given to the study of argumentation and brief-drawing. The class is divided into teams for the platform discussion of leading questions of the day. This course is designed to develop readiness in extempore speaking. It is recommended for those who desire to enter the intercollegiate debates. Prerequisite, Course 3; 2 hours. Credit, 2.
MR. MCKAY.

10. DRAMATIC READING. — Critical study of one play; analysis of character, plot and incident; expressional reading of principal scenes. Plays preferably selected from Shakspere. Prerequisite, Course 3; 1 hour. Credit, 1. MR. MCKAY.

Department of Modern European Languages.

FRENCH.

Required Courses.

1. ELEMENTARY FRENCH. — A beginning course. Fraser & Squair's "French Grammar;" reader; graduated texts. Required of freshmen presenting German for entrance who do not continue that language and have not studied French; open upon arrangement to other students. Freshmen; 4 hours. Credit, 4.
MR. MACKIMMIE.

2. ELEMENTARY FRENCH. — As stated under Course 1. Prerequisite, Course 1. MR. MACKIMMIE.

3. INTERMEDIATE FRENCH (third year). — Training for rapid reading; the reading of a number of standard novels and plays; composition; reports on collateral reading from periodicals and scientific texts in the library. Required of freshmen who present two years of French for entrance and do not take German, and of sophomores who take Courses 1 and 2 as freshmen; open upon arrangement to other students; 4 hours. Credit, 4.
MR. MACKIMMIE.

4. INTERMEDIATE FRENCH. — As stated under Course 3, but not required of sopohomores who take Courses 1 and 2 as freshmen. Prerequisite, Course 3. Mr. MACKIMMIE.

5. ADVANCED FRENCH (fourth year). — A reading course; representative masterpieces of the nineteenth century; collateral reading and written reports. Required of sophomores who take Courses 3 and 4 as freshmen; open upon arrangement to other students. Prerequisite, Course 4; 3 hours. Credit, 3.
Mr. MACKIMMIE.

Elective Courses.

6. ADVANCED FRENCH (fourth year). — A general view of the history of French literature. Several plays of the great classical dramatists will be read. Prerequisite, Course 5. Sophomores; open upon arrangement to other students; 3 hours. Credit, 3.
Mr. MACKIMMIE.

7. FRENCH LANGUAGE OR LITERATURE (fourth year). — Courses in more advanced subjects; to be announced; 3 hours. Credit, 3.
Mr. MACKIMMIE.

8. FRENCH LANGUAGE OR LITERATURE. — As outlined under Course 7. Mr. MACKIMMIE.

SPANISH.

Elective Courses.

1. ELEMENTARY SPANISH. — Grammar, with special drill in pronunciation; reading from a simple reader. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. MACKIMMIE.

2. MODERN SPANISH AUTHORS. — Reading from modern Spanish novel and drama. Prerequisite, Course 1. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. MACKIMMIE.

GERMAN.

Required Courses.

1. ELEMENTARY GERMAN. — Grammar and composition; the reading of short stories, poems, plays, etc. Required of those presenting French for entrance who do not continue that language and have not studied German. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Mr. ASHLEY.

2. Elementary German. — As stated under Course 1. Prerequisite, Course 1. Mr. Ashley.

3. Intermediate German. — Rapid reading of selected works from Schiller, Goethe, Lessing and others; review of grammar; outside readings. Required of freshmen who present German for entrance and do not take French, and of sophomores who took Courses 1 and 2 as freshmen. Freshmen and sophomores; open upon arrangement to other students; 4 hours. Credit, 4. Mr. Ashley.

4. Intermediate German. — As stated under Course 3, but not required of sophomores who took Courses 1 and 2 as freshmen. Prerequisite, Course 3. Mr. Ashley.

5. Advanced German. — The rapid reading of selections from the best authors (novels and dramas); outside reading in German periodicals of selected articles concerning various subjects and designed to promote research and reference work. Prerequisite, Course 4. Sophomores; required of those who took German 3 and 4 as freshmen; open upon arrangement to other students; 3 hours. Credit, 3. Mr. Ashley.

Elective Courses.

6. Advanced German. — As stated under Course 5; sophomores; open upon arrangement to other students. Prerequisite, Course 5; 3 hours. Credit, 3. Mr. Ashley.

7. Readings and Investigations. — The reading of novels and journals; presentation by members of class of reports on periodical articles; reports upon assigned reference work in encyclopedias; 3 hours. Credit, 3. Mr. Ashley.

8. Readings and Investigations. — As stated under Course 7. Mr. Ashley.

Music.

Elective Courses.

1. History and Interpretation of Music. — History of music among the ancients; medieval religious and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representantives of the classical school — Bach, Händel, Haydn, Gluck and Mozart. One hour. Credit, 1. Mr. Ashley.

2. History and Interpretation of Music. — A continuation of Course 1. The Romantic school: Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera. The Modern school and Modern composers. One hour. Credit, 1. Mr. Ashley.

Department of Political Science.

Required Courses.

1. Economics. — An introductory course. A study of the nature and scope of economics; the evolution and organization of the present economic system; and the principles of consumption, production, exchange and distribution. Text-books, lectures and essays; required, but may be taken in either the junior or the senior year; 3 hours. Credit, 3. Assistant Professor Eyerly.

Elective Courses.

2. Government. — The organization and working of the various kinds of government in the United States; government problems connected with transportation, taxation and monopolies; comparison of State leadership in American agriculture with that in European agriculture. Text-books, lectures and assigned reading; 3 hours. Credit, 3. Assistant Professor Eyerly.

3. Sociology. — The nature, scope and principles of sociology; social origins and structures; control by custom, religion. education, public opinion, law, etc.; social ideals; practical problems in social progress. Lectures, text-book and assigned readings; 3 hours. Credit, 3. Assistant Professor Eyerly.

4. Economic History. — The economic history of England to the reign of Henry VIII.; the history of England and the American colonies in conjunction to 1783; and thereafter the history of England and of the United States. Emphasis is laid on economic history, but the more important political and religious movements are treated in their economic relations. Text-books, lectures and assigned reading; 3 hours. Credit, 3.

Assistant Professor Eyerly.

5. The History of New England. — In this course, New England is regarded as a unit. Although the history of agriculture and rural life is treated with special fullness, ample attention is given

to political, religious and ethical history. It is hoped that the student will not only be led to an intelligent understanding of present economic conditions, but will also be imbued with a progressive loyalty to the highest ideals of the New England of the past. Lectures and required reading; 3 hours. Credit, 3.

Mr. HOLCOMB.

6. PRACTICAL PROBLEMS IN ECONOMICS. — An advanced course following Economics 1. A group of problems will be selected for careful study. Each student will make a special study of one of the following topics: labor, capital, money, banking, insurance, protection and free trade, railways, corporations, and the personal distribution of wealth. Lectures, assigned readings and reports; 3 hours. Credit, 3. Assistant Professor EYERLY.

7. THE HISTORY OF IDEALS. — This course is intended to supplement Course 4, treating history from the idealistic, rather than from the economic, point of view. It attempts to define the great ideals which have impelled the most important social, political, esthetic, ethical and religious movements of medieval and modern history, and to trace the causes of the success or failure of the movements to which these ideals have led. The ideals of Christianity, including monasticism, modern Catholicism and Protestantism; of medieval art and architecture; of political and social democracy, including universal suffrage, the abolition of slavery, modern socialism and social reform — may be taken as examples. Lectures and required reading. Although Course 4 is not a prerequisite to this course, students should take both. Three hours. Credit, 3. Mr. HOLCOMB.

Department of Mathematics, Physics and Civil Engineering.

Professor OSTRANDER, Associate Professor HASBROUCK,[1] Captain MARTIN, Mr. DUNCAN.

Required Courses.

1. HIGHER ALGEBRA. — A brief review of radicals, quadratic equations, ratio and proportion, and progressions; binomial theorem, undetermined coefficients, summation of series, continued fractions, logarithms, theory of equations. Wells's "College Algebra." Freshmen; 5 hours a week. Credit, 5.

[Associate Professor HASBROUCK], Captain MARTIN and Mr. DUNCAN.

---

[1] Absent on leave; classes in physics taken by Prof. Joseph O. Thompson of Amherst College.

2. SOLID GEOMETRY. — Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Gore's "Solid Geometry." Freshmen; required unless accepted for admission; 2 hours. Credit, 2. Mr. DUNCAN.

4. PLANE TRIGONOMETRY. — The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry." Required unless accepted for admission. Freshmen; 3 hours. Credit, 3.
[Associate Professor HASBROUCK], Captain MARTIN.

5. GENERAL PHYSICS. — Elementary mechanics and heat. Lectures, recitations and laboratory work. Text, Duff's "Text-Book of Physics." Sophomores; 4 hours class-room work and 1 laboratory period. Credit, 5.
[Adjunct Professor HASBROUCK], Dr. THOMPSON and Mr. DUNCAN.

Elective Courses.

6. GENERAL PHYSICS. — Electricity and light. Duff's "Text-Book of Physics." Lectures, recitations and laboratory work. Sophomores; 2 hours of class-room work and 1 laboratory period. Credit, 3.
[Adjunct Professor HASBROUCK], Dr. THOMPSON and Mr. DUNCAN.

9. ADVANCED PHYSICS. — The senior elective in physics is not offered for the year 1909–10.
Adjunct Professor HASBROUCK.

8. PLANE SURVEYING. — The elements of the subject, including the adjustment and use of the usual instruments. Text-book and lectures. Sophomores; 6 hours a week. Credit, 3.
Mr. DUNCAN.

7. ANALYTIC GEOMETRY. — A discussion of the geometry of the line, the circle, of conic sections and of the higher plane curves. Fine and Thompson's "Coördinate Geometry." Prerequisites, Mathematics 1, 2 and 4; 3 hours a week. Credit, 3.
Professor OSTRANDER.

10. DIFFERENTIAL AND INTEGRAL CALCULUS — A first course in the subject, with some of the more important applications. Snyder and Hutchinson's "Differential and Integral Calculus." Prerequisites, Mathematics 1, 2, 4 and 7; 5 hours. Credit, 5.
Professor OSTRANDER.

[11. HYDRAULICS AND SANITARY ENGINEERING.[1] — Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Text-book and lectures; 3 hours. Not given in 1910–11. Credit, 3.
Professor OSTRANDER.]

[12. ADVANCED SURVEYING.[1] — Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Text-book and lectures; 6 hours. Not given in 1910–11. Credit, 5. Professor OSTRANDER.]

13. STRESSES IN STRUCTURES.[1] — An elementary course in roof and bridge stresses. Text-book and lectures; 4 hours. Not given in 1911–12. Credit, 3. Professor OSTRANDER.

14. STRENGTH OF MATERIALS, FOUNDATIONS AND MASONRY CONSTRUCTION.[1] — Text-book and lectures; 5 hours. Not given in 1911–12. Credit, 5. Professor OSTRANDER.

15. ANALYTIC MECHANICS. — A course in theoretical mechanics, based on the calculus, with applications to problems. Text-book and lectures. Prerequisites, Mathematics 7, 10; 3 hours. Not given in 1909–10. Credit, 3. Professor OSTRANDER.

17. DESCRIPTIVE GEOMETRY. — An elementary course; given only in 1909–10. Five hours. Credit, 3. Professor OSTRANDER.

Department of Military Science and Tactics.

Captain MARTIN.

[The Department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-years course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

---

[1] Instruction in civil engineering will be given in two distinct courses of one year each, the courses alternating. The courses are open to students of the junior and senior classes.

Under this arrangement, the practical (drill) courses in Military Science are given up to the Christmas recess and from the close of the spring recess to the end of the semester each year; the corresponding courses in Physical Education occupy the intervening time.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

A dark blue uniform, old army pattern, costing about $15, is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $15 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited, unless the consent of the military instructor be obtained.]

Required Courses.

1. INTRODUCTION TO MILITARY SCIENCE AND TACTICS. — Practical instruction in infantry drill regulations through the school of the battalion in close and extended order; advance and rear guards; outposts; marches; ceremonies; guard duty. Upon the conduct and proficiency of this year depends the appointment of corporals for the ensuing year. Freshmen; first semester until Christmas recess; 3 hours. Credit, 1. Captain MARTIN.

2. INTRODUCTION TO MILITARY SCIENCE AND TACTICS. — As stated under Course 1. Freshmen; second semester after Spring recess; 3 hours. Credit, 1. Captain MARTIN.

3. PRACTICE OF MILITARY SCIENCE AND TACTICS. — Practical instruction as before; pointing, aiming and sighting drills; litter drills, and first aid to the injured by detachment; target practice, in gallery and on the range. Corporals are appointed from this class. On their conduct and proficiency depends the appointment of sergeants in the next class. Sophomores; first semester until Christmas recess; 3 hours. Credit, 1. Captain MARTIN.

4. PRACTICE OF MILITARY SCIENCE AND TACTICS. — As stated under Course 3. Sophomores; second semester after spring recess; 3 hours. Credit, 1. Captain MARTIN.

5. Theory of Military Science and Tactics. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the company, "Manual of Guard Duty," "Small Arms Firing Regulations." Sophomores; 1 hour. Credit, 1.
Captain Martin.

6. Theory of Military Science and Tactics. — As stated under Course 5. Sophomores; 1 hour. Credit, 1.
Captain Martin.

7. Practice of Higher Military Science and Tactics. — Practical instruction as before, target practice, in gallery and on the range. Sergeants are appointed from this class. On their conduct and proficiency depends their selection as officers for the ensuing year. When necessary, officers will also be appointed from this class. Juniors; first semester until Christmas recess; 3 hours. Credit, 1. Captain Martin.

8. Practice of Higher Military Science and Tactics. — As stated under Course 7. Juniors; second semester after spring recess; 3 hours. Credit, 1. Captain Martin.

9. Theory of Higher Military Science and Tactics. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the battalion; advance and rear guards; outposts; marches and ceremonies; "Manual of Field Service Regulations;" preparation of reports, returns, muster-rolls, enlistment and discharge papers, rosters, requisitions, etc.; army regulations; lectures on military science. Juniors; 1 hour. Credit, 1.
Captain Martin.

10. Theory of Higher Military Science and Tactics. — As stated under Course 9. Juniors; 1 hour. Credit, 1.
Captain Martin.

Elective Courses.

11. Advanced Military Science and Tactics. — Practical instruction as before; conduct of drills of lower classes. Officers will as a rule be selected from this class. Cadets electing Courses 11 and 12 must make the election for the year, and not later than the first Monday in June of their junior year. No cadet electing this course will after the commencement drill be permitted to change his election without the consent of the dean of the faculty and of the commandant. Seniors electing Courses 11 and 12 are re-

quired to report for three hours of work a week in the Department of Physical Education when drill is suspended. Seniors; first semester until Christmas recess; 3 hours. Credit, 1.
Captain MARTIN.

12. ADVANCED MILITARY SCIENCE AND TACTICS. — As stated under Course 11. Seniors; second semester after spring recess; 3 hours. Credit, 1. Captain MARTIN.

Department of Physical Education and Hygiene.

Assistant Professor REYNOLDS.

HYGIENE.

Required Courses.

1. HYGIENE. — Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation. Freshmen; 1 hour. Credit, 1. Assistant Professor REYNOLDS.

PHYSICAL EDUCATION.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in Military Science. All classified undergraduate students are given a physical examination upon entering. A similar examination is given at the beginning of the athletic seasons to all candidates for training for class or college athletic contests.]

Required Courses.

1. ELEMENTARY GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 2. Freshmen; 3 hours. Credit, 1. Assistant Professor REYNOLDS.

2. ELEMENTARY GYMNASTICS. — As stated under Course 1.
Assistant Professor REYNOLDS.

3. GRADED GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 4. Sophomores; 3 hours. Credit, 1. Assistant Professor REYNOLDS.

4. GRADED GYMNASTICS. — As stated under Course 3.
Assistant Professor REYNOLDS.

5. HEAVY GYMNASTICS. — Drills, games and athletics; from January 1 to April 1, in connection with Course 6. Juniors; 3 hours. Credit, 1. Assistant Professor REYNOLDS.

6. HEAVY GYMNASTICS. — As stated under Course 5.
Assistant Professor REYNOLDS.

Elective Courses.

7. TRAINING COURSE. — Leadership of class and squad work; supervision of indoor and outdoor athletic contests and games; boxing and wrestling. Seniors; 3 hours. Credit, 1.
Assistant Professor REYNOLDS.

8. TRAINING COURSE. — As stated under Course 7.
Assistant Professor REYNOLDS.

9. ADVANCED GYMNASTICS. — For those who wish to become candidates for the gymnastic team. Credit, 0.
Assistant Professor REYNOLDS.

10. ADVANCED GYMNASTICS. — As stated under Course 9.
Assistant Professor REYNOLDS.

Department of Rural Social Science.

President BUTTERFIELD, Assistant Professor EYERLY, Dr. CANCE.

AGRICULTURAL ECONOMICS.

Required Courses.

2. AGRICULTURAL INDUSTRY AND RESOURCES. — A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions. Sophomores; 3 hours. Credit, 3. Dr. CANCE.

Elective Courses.

4. ELEMENTS OF AGRICULTURAL ECONOMICS. — This course is designed to follow the required work in the elements of economics. It will consider the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; the agricultural market; determination of price; speculation; problems of land tenure and land values; business co-operation; farmers' organizations; the farmer and legislation; the maintenance of

the social, political and economic status of the farmer; and the relation of the farmer to the State. Lectures, text, readings, topics and field work; 3 hours. Credit, 3. Dr. CANCE.

5. HISTORICAL AND COMPARATIVE AGRICULTURE. — A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on present conditions and the history of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, to show that the agriculture of any country is a distinct individual problem, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Seniors; open to other students upon arrangement; prerequisite, Course 4 or equivalent; 3 hours. Credit, 3. Dr. CANCE.

6. CO-OPERATION IN AGRICULTURE. — The course contemplates a somewhat comprehensive view of the history, principles and social relations of agricultural organization for profit. Part I., The business aspects of co-operation: (1) A survey of the development and progress, the methods and economic results, of the farmers' organizations and great co-operative movements in the past; (2) the phases of business organization of agriculture abroad, and the present aspects and tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers, and practical working plans for co-operative associations, as illustrated by the most advanced and prosperous business organizations and exchanges, with particular reference to the marketing of perishable products. Part II., Social aspects of co-operation: The second part of this course treats of the social conditions necessary to successful co-operation; the effect of co-operation on character, *e.g.*, on individualism, conservatism; the relation of co-operation to political achievement, especially as illustrated in European countries; the influence of co-operation in begetting a community consciousness; and the effect of organization on class status. Lectures, assigned reading and practical exercises; 3 hours. Credit, 3. Dr. CANCE (Part I.)
Assistant Professor EYERLY (Part II.)

7. SPECIFIC PROBLEMS IN AGRICULTURAL ECONOMICS. — An advanced course for students desirous of studying more intensively

some of the problems immediately affecting the welfare of the farmer and society. Some of the problems that may be studied are: land problems; land tenure; size of farms; causes affecting land values; private property in land; taxation and inheritance; special problems; marketing and manufacturing farm products; co-operative enterprises and farmers' societies; cost of production; farm labor in New England; immigration; shifting of the rural population. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest. Seniors; open upon arrangement to other students; enrollment subject to approval of instructor; 2 hours a week. Credit, 2. Dr. CANCE.

9. SEMINAR. — Research in agriculture: New England agriculture to 1860. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged. Credit, 1. Dr. CANCE.

10. SEMINAR. — As stated in Course 9. Dr. CANCE.

RURAL SOCIOLOGY.

Elective Courses.

12. THE RURAL COMMUNITY. — There are two general divisions of the subject. There is, first, a study of the social status of the rural population, including the significance of the movement to the cities, the present social conditions of farm people, the social effects of rural life, and the social aspect of various agricultural questions of a technical or economic character. In the second part of the study will be discussed the various social agencies in rural progress, such as means of communication, farmers' organizations, rural schools, means of agricultural education, rural religious institutions and the federation of rural social agencies. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3.
President BUTTERFIELD and Assistant Professor EYERLY.

RURAL LAW.

Elective Courses.

[14. RURAL LAW. — The course in rural law is given in 1909–10 in accordance with the announcement in the catalogue of 1908–09; but it will not be given again unless further announcement be made.]

Department of Veterinary Science.

Professor PAIGE.

[The courses in veterinary science have been arranged to meet the needs of students who purpose following practical agriculture, and of prospective students of human and comparative medicine.]

Elective Courses.

1. INTRODUCTORY BACTERIOLOGY. — The object of this course is to acquaint the student with the various organisms found in air, water, soil, milk and the body, and with the relation of these organisms to such processes as decomposition, fermentation and digestion, and to the production of disease. Toxic substances resulting from the growth of organisms, and the antitoxins used to counteract their action, are considered. Lectures, recitations and laboratory work. Seniors; 3 two-hour laboratory exercises. Credit, 3. Professor PAIGE.

3. VETERINARY SCIENCE. — A course treating of veterinary hygiene, comparative anatomy and general pathology; veterinary materia medica and therapeutics; the theory and practice of veterinary medicine; general, special and operative surgery; and veterinary bacteriology and parasitology. Lectures, clinics, demonstrations and laboratory exercises. Must be followed by Course 4. Seniors; 5 hours. Credit, 5. Professor PAIGE.

4. VETERINARY SCIENCE. — As stated under Course 3. Professor PAIGE.

Department of Zoölogy and Geology.

Prof. CHARLES H. FERNALD, Assistant Professor GORDON.

ZOÖLOGY.

Required Courses.

1. ELEMENTARY ZOÖLOGY. — This forms the zoölogical part of an introductory course in biology. Laboratory dissection and lectures; laboratory text, Drew's "Invertebrate Zoölogy." Sophomores; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

Elective Courses.

3. INVERTEBRATE ZOÖLOGY. — This course does not include the insects. Economic zoölogy. Text-books, Parker & Haswell's "Textbook of Zoölogy," Vol. I., and Drew's "Invertebrate

Zoölogy." Prerequisite, Course 1 or its equivalent. Must be followed by Course 3. Juniors; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

4. VERTEBRATE ZOÖLOGY. — Text-book, Parker & Haswell's "Textbook of Zoölogy," Vol. II. Prerequisite, Course 3. Juniors; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

5. ANIMAL PARASITES. — A survey of this special field of zoölogy. Laboratory and lecture work, with outside reading. Laboratory technique. Seniors; not open to fewer than 3 students. Prerequisites, Courses 1, 3 and 4. Three two-hour periods, 2 one-hour periods. Credit, 5. Assistant Professor GORDON.

6. ANIMAL PARASITES. — A continuation of Course 5. Two two-hour periods, 1 one-hour period. Credit, 3. Assistant Professor GORDON.

7, 8 and 9. ADVANCED ZOÖLOGY. — See "Graduate School."

GEOLOGY.

Elective Courses.

2. GENERAL GEOLOGY. — Rock-forming minerals; rock types; dynamical, structural and surface geology. Lectures, map and field work. Sophomores; 1 two-hour laboratory period and 2 lecture periods. Credit, 3. Assistant Professor GORDON.

THE GRADUATE SCHOOL.

THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., President of the College.

CHARLES H. FERNALD, Ph.D., Director of the Graduate School and Professor of Zoölogy.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years. Demands for these courses have now greatly increased, and in recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station agriculturists, bacteriologists, botanists, chemists, entomologists, horticulturists and zoölogists; and for numerous other positions requiring a great degree of skill and scientific knowledge.

ADMISSION.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the professor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for admission to the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, — together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

NATURE AND METHODS OF GRADUATE WORK.

Persons taking graduate work will find this quite different in its nature from undergraduate courses. A broad knowledge of two (or three) subjects is required, and the professors in charge of these may adopt any methods which may seem desirable to secure this to the student. Lectures, laboratory and field work in various forms are utilized; but whatever the method chosen, the aim is to train the students in methods of original investigation and experiment, inductive reasoning and the ability to carry on independent research. In addition to the lectures, a large amount of outside reading is required, the object being to give a broad knowledge of all aspects of the subjects chosen, in addition to the complete knowledge of those portions involved in or directly related to the original investigation which is to result in the thesis. Originality and ability to lead in scientific research after completing graduate work, and the establishment of a broad and thorough foundation upon which these qualities must be based, are the objects aimed at; and any methods which promise to give these results may be made use of (varying according to the nature and personal equation of each student), the supervision being largely individual rather than collective.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as the major and the other as the minor. These subjects may not be selected in the same department.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major, the others as minors. No two of these subjects may be taken in the same department.

Advanced students who are not candidates for degrees may, with the approval of the faculty of the school, take more than one subject in the same department.

A statement of the subjects chosen must in each case be submitted to the director of the school for approval by the necessary committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

A description of the equipment of the various departments is given under "General Information."

THESES.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject, must show that its writer possesses the ability to carry on original research, and must be an actual contribution to knowledge.

The thesis in its final form, ready for the printer, must be submitted to the director of the school for examination by the committee on the graduate school before the candidate for the doctor's degree may take the required oral examination. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in the thesis.

All theses become the property of the department in which they are prepared. When they are printed, five copies of each thesis must be deposited with the department.

FINAL EXAMINATIONS.

For the degree of master of science, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degree of doctor of philosophy, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

DEGREES CONFERRED.

The degree of master of science is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.

2. The devotion of twenty hours each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The degree of doctor of philosophy is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

2. The devotion of twenty hours each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science is $10, and for the degree of doctor of philosophy, $25.

Courses for Degree of Master of Science.

Available either as major or minor subjects for the degree of master of science: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Mathematics and physics.
Veterinary science.

Courses for the Degree of Doctor of Philosophy.

Available for a major subject for the degree of doctor of philosophy: —

Botany.
Chemistry.
Entomology.
Horticulture.

Available for a minor subject for the degree of doctor of philosophy: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Zöology.

GENERAL OUTLINE OF COURSES FOR THE DOCTORATE.

(*a*) *Major Courses.*

BOTANY. — The following subjects in botany may be studied: —

(*a*) Vegetable physiology.
(*b*) Vegetable pathology.
(*c*) Mycology.
(*d*) Ecology.
(*e*) Taxonomy.
(*f*) Phylogeny.
(*g*) History of botany.
(*h*) History and theory of evolution.

These subjects are pursued, to a greater or less extent, as the previous training of the student and the nature of the original problem undertaken may determine. The object of the course is to give the student a technical training in botany, to develop the spirit of research and to lay a broad foundation in the subject. (As a supplement to this course the student will do well to take, in addition to his prescribed minor work, a brief course in the history of philosophy and psychology.) Extensive reading of botanical literature, both general and specific, is required in certain subjects, and occasional lectures are given. A botanical conference is held monthly, in which various new problems of botanical science are considered by graduate students and the seniors who elect botany. A thesis dealing with some economic problem in plant physiology or pathology, or in both, and containing a distinct contribution to knowledge, is required.

CHEMISTRY. — The following subjects in chemistry may be studied: —

(*a*) Inorganic analysis, qualitative (of the rarer elements) and quantitative.
(*b*) Crystallography.
(*c*) Physical chemistry.
(*d*) Descriptive and determinative mineralogy.
(*e*) Chemical geology.
(*f*) Soil formation.
(*g*) Soil physics and chemistry; gas analysis; synthetic inorganic work.
(*h*) Chemical theory and history.
(*i*) General organic chemistry.
(*j*) Special topics in organic chemistry.
(*k*) Elementary quantitative organic analysis.

(*l*) Proximate qualitative and quantitative organic analysis, including determination of organic radicles.
(*m*) Organic synthesis of aliphatic and aromatic compounds.
(*n*) Problems in chemical manufacture.
(*o*) Recent chemistry of plant nutrition.
(*p*) Animal physiological and pathological chemistry, including the chemistry of foods, of milk and milk industries, of urine, urinalysis, and the standards for feeding of all kinds.
(*q*) Toxicology.
(*r*) Insecticides and fungicides.

Frequent examinations on current chemical literature are given. Early in the course original work on some chemical subject pertaining to agriculture must be begun. The history and results of this work must, before the awarding of the degree, be submitted in the form of a thesis containing a distinct contribution to knowledge.

ENTOMOLOGY. — I. For the degree of doctor of philosophy as a major: Some knowledge of all the divisions of this subject is essential for the professional entomologist, though a large part of his time will be devoted only to certain portions. To insure some familiarity with all these divisions, lectures, laboratory work, field training or required reading are given in each of the following topics: —

(*a*) *Morphology.* — Embryology; life history and transformations; histology; phylogeny and the relation of insects to other arthropods; hermaphroditism; hybrids; parthenogenesis; pedogenesis, heterogamy; chemistry of colors of insects; luminosity; deformities of insects; variation; duration of life.

(*b*) *Ecology.* — Dimorphism; polymorphism; warning coloration; mimicry; insect architecture; fertilization of plants by insects; instincts of insects; insect products of value to man; geographical distribution in the different faunal regions; methods of distribution; insect migration; geological history of insects; insects as disseminators of disease; enemies of insects, vegetable and animal, including parasites.

(*c*) *Economic Entomology.* — General principles; insecticides; apparatus; special cases; photographs of insects and their work; methods of drawing for illustrations; field work on insects and study of life histories; legislation concerning insects.

(*d*) *Systematic Entomology.* — History of entomology, including classifications and the principles of classification; laws governing nomenclature; literature, how to find and use it; indexing literature; number of insects in collections and in existence (estimated); lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections of insects.

(*e*) *Seminar.* — A monthly meeting of graduates, at which reports on current literature are presented and various entomological topics of importance are discussed.

(*f*) *Required Readings.* — The best articles on the various topics named above and on the different orders of insects, to cover from fifteen thousand to twenty thousand pages of English, French and German, the candidate to be examined at the close of his course on this with his other work.

(*g*) *Thesis.* — A thesis, illustrated with drawings, consisting of the results of original investigation upon one or several topics, and constituting a distinct contribution to knowledge, must be completed before the final examinations are taken.

II. For the degree of doctor of philosophy as a minor, and for the degree of master of science either as a major or minor: Such portions of the course outlined above as seem most appropriate to their other subjects are given to students taking entomology under these conditions.

HORTICULTURE. — The work in horticulture necessarily varies considerably with different candidates, since its most important features are specialization, original investigation and the development of individual initiative in dealing with new questions. Each candidate must select some special field of horticultural study, and devote himself to it continuously. He will be required to attend lectures, conferences and seminars dealing with horticulture in its broader aspects, and to do advanced work in the following subjects: —

(*a*) Systematic pomology.
(*b*) Pomological practice.
(*c*) Commercial pomology.
(*d*) Systematic, practical and commercial olericulture.
(*e*) Greenhouse plants and problems.
(*f*) Floriculture.
(*g*) Landscape gardening.
(*h*) Plant breeding and general evolution.
(*i*) Questions of physiology connected with propagation and pruning.

Other requirements and opportunities are (1) periodical seminars, with special lectures by prominent men from outside the college; (2) extensive and systematically planned readings; (3) frequent visits, always with definite purpose, to orchards, gardens, greenhouses, estates and libraries outside the college grounds; and (4) the preparation and publication of a thesis which shall set forth the results of the candidate's major study, and be an original and positive contribution to horticultural knowledge.

(*b*) *Minor Courses.*

ZOÖLOGY. — The courses in zoölogy are offered as a minor course to candidates for the degree of doctor of philosophy. They constitute an intensive course designed to give a broad outlook and to meet the needs of the specialist, and call for original investigation, laboratory dissection, technique and museum work. The subjects treated and the work done will vary according to circumstances, but may be outlined thus: —

(*a*) General and comparative anatomy, both gross and microscopic; ontogeny and phylogeny; life cycles, metamorphosis and metagenesis; animal associations, colonial, commensal and parasitic, and symbiotic associations of animals and plants; adaptation, adaptive radiation and parallelisms.

(*b*) Geologic, geographic and bathymetric distribution of animals.

(*c*) Systematic zoölogy, including paleozoölogy; museum and field technique.

(*d*) Economic zoölogy.

(*e*) History and development of zoölogical science.

(*f*) Weekly seminar and journal club meetings, in which all advanced students of zoölogy take an active part.

(*g*) Collateral reading; general knowledge of current zoölogical literature.

OTHER SUBJECTS. — Courses in the other subjects open to choice as minors will be outlined according to the qualification and needs of the students applying for them.

SHORT COURSES.

SHORT COURSES.

A. Organization, Expenses and Admission.
B. The Winter School.
C. The Summer School.
D. Itinerant Instruction.

A. ORGANIZATION, EXPENSES AND ADMISSION.

ORGANIZATION. — The work of the short courses in the college was organized in September, 1909, with a director in charge.

The object of the short course work is threefold: —

(1) To bring to the college for instruction for a few days or a few weeks as many people as can possibly be reached in this way.

(2) To disseminate, by various methods, agricultural information to people who cannot come to the college even for a short time.

(3) To make the college as useful as possible to all the people of the Commonwealth who are interested in agriculture and country life.

The work for the first year has been organized thus: —

1. *The Winter School.*

Ten weeks' general course.

Short course in poultry management.

Farmers' week.

Beekeepers' course.

2. *The Summer School.*

Courses in agriculture for teachers and others interested in country life.

Courses for country clergymen.

Courses in home economics and domestic science for rural teachers, city teachers and clergymen's wives.

Conference for rural social workers.

3. *Itinerant Instruction.*

Correspondence courses.
Lecture courses.
Practical field demonstrations.
Traveling schools.
Educational trains (steam and trolley).
Educational exhibits at fairs.
Demonstration orchards.
Demonstration field experiments.
Services of expert agricultural authorities.
Agricultural surveys.
Advisory work with schools, State institutions and individuals.

EXPENSES IN THE SHORT COURSES. — The expenses of attending either of the short courses will be about as follows: —

Tuition to citizens of the United States,	Free.
Furnished rooms with private families, per week,	$1–$3
Board at college dining hall, per week,	$3.75
Board with private families, per week,	$4–$5

Students in either of the dairy courses must provide themselves with two white wash suits and a white cap for use in the practical dairy work; the cost in Amherst is about $1.25 for suit and cap.

REQUIREMENTS FOR ADMISSION TO SHORT COURSES. — No entrance examinations are required, but students are advised to review their school work in English and arithmetic before entering. Practical experience in farm, garden, orchard or greenhouse work will be an advantage. The courses are open to both men and women. Students must be at least eighteen years of age, and must furnish satisfactory evidence of good moral character.

Application for admission should be made as early as possible. Students should report to the professor in charge on Monday, Jan. 2, 1911, in order to begin work promptly on the morning of January 3.

B. THE WINTER SCHOOL.

1. The Ten Weeks' Course.
2. The Short Course in Poultry Management.
3. Farmers' Week.
4. Beekeepers' Course.

1. The Ten Weeks' General Course.

Jan. 2–March 10, 1910.

Agriculture, Dairying, Fruit Growing and Floriculture.

a. Faculty.
b. Courses of Instruction.
c. Further Information.

a. Faculty.

Resident Instructors.

Kenyon L. Butterfield, President, and Professor of Rural Sociology.
Alexander E. Cance, Instructor in Agricultural Economics.
Elmer K. Eyerly, Assistant Professor of Political Science, Lecturer on Rural Sociology.
Henry T. Fernald, Professor of Entomology.
James A. Foord, Professor of Farm Administration.
Edwin H. Forristall, Farm Superintendent.
Charles R. Green, Librarian.
Ray L. Gribben, Instructor in Animal Husbandry.
William R. Hart, Professor of Agricultural Education.
Sidney B. Haskell, Instructor in Agronomy.
Charles S. Heller, Instructor in Market Gardening.
William D. Hurd, Director of Short Courses.
Harry H. Jennison, Assistant in Botany.
William P. B. Lockwood, Assistant Professor of Dairying.
Robert W. Lyman, Lecturer on Farm Law.
A. Vincent Osmun, Assistant Professor of Botany.
James B. Paige, Professor of Veterinary Science.
Fred C. Sears, Professor of Pomology.
John N. Summers, Assistant in Entomology.
Edward A. White, Professor of Floriculture.
Newton Wallace, Electrician.

Non-resident Lecturers.

The instruction of the regular faculty will be supplemented each week by that of non-resident lecturers. These will usually be practical men who have been notably successful in their chosen work. A part list is given below: —

George A. Drew, Greenwich, Conn.
J. H. Hale, South Glastonbury, Conn.
Charles E. Lyman, Middlefield, Conn.
C. L. Gold, Middlefield, Conn.
Wilfred Wheeler, Concord, Mass.
A. McNeill, Chief of Fruit Division, Ottawa, Ont.

Clark Allis, Medina, N. Y.
Harold L. Frost, Arlington, Mass.
E. O. Orpet, South Lancaster, Mass.
Peter Fisher, Ellis, Mass.
William H. Elliot, Brighton, Mass.
Eber Holmes, Montrose, Mass.
M. A. Patten, Tewksbury, Mass.
Edwin McMulkin, Boston, Mass.

b. Courses of Instruction.

1. Soil Fertility. — The nature of soils, their chemical and physical properties; the improvement of "run-down" land; tillage; green manuring; crop rotation; drainage; stable manures, their value, composition, preservation and application; commercial fertilizers, their nature, and the materials which furnish their different elements; fertilizers for different crops, the duplication of formulæ; lime and liming. Three exercises a week for ten weeks.

2. Market Gardening. — A general survey of the market-gardening business, together with a study of the most important problems involved, such as location, soils, fertilizers, crops, systems of cropping, markets and marketing. Three exercises and a laboratory period a week for ten weeks.

3. Fruit Growing. — The work in this course will deal with the practical side of the growing and marketing of fruits. Especial attention will be given to such questions as the selection of site for the plantation, choice of varieties, grafting and budding, spraying, pruning, cultivation and cover crops, fertilizing the fruit plantation, packing and marketing. Lectures, supplemented with demonstrations, and, wherever possible, actual work by the students. Five exercises a week for ten weeks. Students electing horticulture will be required to take Course 1, and are recommended to take Courses 10 and 11.

4. Floriculture. — This course is outlined with the idea of furnishing young men who have not the time to devote to a longer course with the theoretical and practical considerations which are essentials for success in floriculture. The course will cover, as thoroughly as time will permit, those aspects of the work of special interest to the grower. Some of the topics to be considered are: greenhouse construction; greenhouse details, such as ventilators, gutters, benches, etc.; greenhouse furnishings and equipment; heating; florists' crops and florists' trade. In addition to the regular lecture work of the course, it is expected that lectures will be given by experts in growing special crops, such as roses, carnations, violets

and orchids. The co-operation of several of the most successful florists has been secured for these lectures. Students electing this course must also take Courses 1, 11 and 12. Five exercises a week.

5. Field Crops. — The production of field crops for New England; species and varieties, agricultural characteristics, methods of culture, rotations, harvesting and curing. The laboratory work will give the student practice in seed selection and testing for quality, purity and germination, and in corn and potato judging. See Course I. Three exercises a week for ten weeks.

6. Breeds of Live Stock and Animal Breeding. — The principles of breeding and the methods of improving farm stock. A study of the characteristics and development of our modern breeds of live stock, and their adaptation to New England conditions. Special attention will be given to dairy cattle. One exercise a week will be devoted to stock judging. Three exercises a week.

7. Live-stock Feeding and Management. — The character and composition of feeding stuffs, and their action and influence upon the animal body and production; practice in compounding rations; the principles and practice of the feeding, care and management of live stock. Two exercises a week.

8. Animal Diseases and Stable Sanitation. — Lectures upon some of the common diseases of live stock, giving special attention to methods of prevention, care and sanitation; the treatment of emergencies and accidents; how to keep animals healthy. Two exercises a week.

9. Dairying. — Milk and milk production; creaming methods; Babcock and acid tests; methods for testing individual cows; milk handling for local markets; ripening cream and butter making; dairy buildings, their lighting, ventilation and sanitation. Three one-hour, 2 two-hour and 2 three-hour periods.

10. Dairy Bacteriology. — The characteristics and functions of bacteria, and their relation to the different branches of the dairy industry; the scientific basis of cream ripening, sterilization, pasteurization, control of fermentation, and production of the best quality of market milk. Two exercises a week.

11. Botany. — A study of the structure, function and diseases of greenhouse, garden, orchard and field crops, together with methods of prevention, including spraying and the application of fungicides. One period each week will be devoted to laboratory work. Three exercises a week.

12. Entomology. — Animal parasites and their prevention. A study of the insects causing most injury to farm, orchard, garden

and greenhouse crops, and of methods for their destruction or control. Three exercises a week.

13. MECHANICS. — Care of boilers, engines and dairy machinery; installing and lining shafts and pulleys; calculating speeds of pulleys, etc.; cement foundations and floors; plans for farm and dairy buildings. One two-hour exercise a week.

14. FARM ACCOUNTS. — Practical work in keeping farm accounts and records; a simple system by which profits and losses of the farm may be traced to their original sources. One exercise a week.

15. FARM BUILDINGS AND MACHINERY. — Location and planning of farm buildings and water supply, and the construction, care and operation of farm machinery. One period a week for ten weeks.

16. RURAL BETTERMENT. — In order that those who attend the ten weeks' course may receive instruction in topics of vital interest to rural communities, as well as in the so-called more practical agricultural subjects, several lectures will be given as the course proceeds. The subjects and lecturers are named below; hours will be arranged to avoid conflict with other exercises.

Rural Sociology, President BUTTERFIELD and Prof. ELMER K. EYERLY.
Rural Education, Prof. WILLIAM R. HART.
Rural Economics, Dr. ALEXANDER E. CANCE.
Farm Law, Judge ROBERT W. LYMAN.

c. *Further Information.*

ASSEMBLY. — All students in the Division of Short Courses are required to attend a weekly assembly, at which an address of general interest is usually given. Attendance at morning chapel service, four times a week, is also required.

2. SHORT COURSE IN POULTRY MANAGEMENT.

Faculty and Specialists. Description of the Work.

Mr. JOHN H. ROBINSON, Boston, Mass., Editor of "Farm Poultry," author, and recognized authority on poultry subjects. — The economic aspects of the poultry industry; systems of poultry keeping; selling poultry products; business methods of the poultryman; egg production, poultry houses, breeding problems.

Prof. F. C. ELFORD, Professor of Poultry Management, MacDonald College, St. Anne de Bellevue, Quebec. — The colony system of housing poultry; judging utility poultry; feeding poultry; crate and pen fattening; killing, dressing and marketing poultry.

Prof. James E. Rice, Professor of Poultry Husbandry, Cornell University, Ithaca, N. Y. — The breeding, feeding, care and management of poultry.

Mr. Edwin F. Gaskill, in charge of poultry experiments at Massachusetts Experiment Station, Amherst, Mass. — The operation of incubators and brooders, and the feeding of poultry.

Mr. D. J. Lambert, in charge of poultry work at Rhode Island State College, Kingston, R. I. — Breeds and types of poultry; breed characteristics, scoring and judging demonstrations.

Dr. George Shurtleff, Boston, Mass. — Lectures and demonstrations on caponizing.

Mr. Henry D. Smith, Rockland, Mass. — The South Shore soft roaster business.

Other Instructors.

Besides the poultry specialists mentioned above, the following members of the faculty of the Massachusetts Agricultural College will also give instruction in the poultry course: —

Prof. William D. Hurd, Director of Short Courses. — The production of poultry feeds; value of poultry manure; soils for the poultry yard; drainage and renovation.

Dr. James B. Paige, Professor of Veterinary Science. — The diseases of poultry, their prevention and treatment.

Prof. Fred C. Sears, Professor of Pomology. — Small fruits as an adjunct of the poultry business.

Mr. Charles S. Heller, Instructor in Vegetable Gardening. — How market gardening can be made a part of the poultry business.

Mr. Ray L. Gribben, Instructor in Animal Husbandry. — Feeds, their composition; feeding rations, etc.

Mr. Clarence A. Jewett, Superintendent of Buildings. — The care and use of tools; practical work in constructing poultry houses, and poultry appliances.

The Massachusetts Agricultural College Poultry Show.

In connection with the work of the short poultry course each year, a poultry show is held. This will be conducted in accordance with the practice of the best shows, the idea being to give the students training in preparing birds for exhibitions, and in showing them. Coops will be provided for all birds sent in for exhibition, and fowls will receive careful care and treatment. A competent judge will score all birds, and the score cards will be returned with the birds. Ribbons will be awarded. No entry fees are charged. Those who attend the course, and all breeders in the State, are invited to send in birds to this exhibit.

3. Farmers' Week.

In order to meet the needs of those who cannot come to the college for any long time, a very practical "farmers' week," four days in length, has been arranged. In the exercises of this week the regular college equipment will be used, and the work of the regular faculty will be supplemented by that of other lecturers and by means of demonstrations given by eminent men.

The work will be divided into three sections; namely, (1) General Agriculture: to include farm management, farm crops, dairying, animal breeding and feeding, veterinary science and bacteriology; (2) Horticulture: to include fruit growing, market gardening, floriculture and forestry; (3) Farmers' Wives' Section: to include lectures and demonstrations in home economics, cookery, and problems of home making.

Interesting exercises of the week will be the evening lectures by specialists in agriculture; the conferences pertaining to problems of rural betterment, aside from practical agricultural topics; a corn and grain show; and others. Complete programs will be published about February 1 each year; they will be sent upon request.

4. Beekeepers' Course.

The college has recently come into possession of a number of swarms of bees, which, with the equipment to be added, will afford an excellent opportunity to give practical information on beekeeping. The course will be given by Dr. William P. Brooks, Director of the Massachusetts Agricultural Experiment Station, and Dr. James B. Paige, — both experts, and of long experience in beekeeping, — and Henry T. Fernald, Professor of Entomology. Besides these, an expert will be engaged for the practical field work. A circular will be issued March 1 each year; it will be sent to all who make request for it.

C. THE SUMMER SCHOOL.

1. Announcement, Purpose, Plan.
2. Faculty.
3. Courses of Study.
4. Conference for Rural Social Workers.
5. General Information.

1. Announcement, Purpose, Plan.

Announcement. — The summer school of agriculture of the Massachusetts Agricultural College for 1910 will open July 11 and close August 12. This will be the fourth session of the summer school; the sessions of 1907, 1908 and 1909 have been highly successful.

Origin and Purpose. — The work of the summer school was planned originally for school teachers, and those attending have largely been teachers. Special attention is given to the needs of this class of students. It has been found, however, that many persons who seek a general knowledge of theoretical and practical agriculture can come to the college conveniently in the summer. Extended courses are therefore offered for the benefit of such persons also. The last four days of the summer school are given up to a conference of rural social workers.

General Plan. — The formal instruction in the summer school is given in twenty courses. From these, each pupil may elect courses, calling for not less than ten nor more than fifteen exercises a week, unless a larger or small amount of work be permitted by the director. These courses include a large amount of field work, observation trips, outdoor exercises and laboratory experiments.

Besides these, general field exercises will be arranged for one afternoon of each week. These exercises concern topics of interest to all. Class excursions will be arranged for every Wednesday afternoon, and more extended excursions for all the school will be planned for every Saturday. These excursions will, as heretofore, be in charge of an instructor. In the past, they have proved a very enjoyable part of the work.

Round tables and special discussions will be arranged by various instructors, as their courses require.

A course of evening lectures on popular topics relating to the work of the school is included in the general program. Several able lecturers have already been engaged for this course. Like the other parts of the summer school work, the lecture course is entirely free.

2. Faculty of the Summer School.

As far as possible, members of the regular faculty of the college give the instruction in the summer school. This brings into use all of the valuable equipment of the laboratories and fields. When it is necessary to engage instructors outside the college, great care is taken to engage men who will fall into the spirit of the work, and who are eminent in their occupation. The faculty of the summer school of 1909 consisted of: —

Kenyon L. Butterfield, President of the college.
Frank A. Waugh, Dean of the summer school, head of the Division of Horticulture, and Professor of Landscape Gardening.
George E. Stone, Professor of Botany.
Henry T. Fernald, Professor of Entomology.
William R. Hart, Professor of Agricultural Education.
James A. Foord, Professor of Farm Administration.
Fred C. Sears, Professor of Pomology.
Edward A. White, Professor of Floriculture.
A. Vincent Osmun, Assistant Professor of Botany.
William P. B. Lockwood, Assistant Professor of Dairying.
Sidney B. Haskell, Instructor in Agriculture.
Harold F. Tompson, Instructor in Market Gardening.
Ray L. Gribben, Instructor in Animal Husbandry.
Floyd B. Jenks, Instructor in Agricultural Education.
Alexander E. Cance, Instructor in Agricultural Economics.
Arthur C. Monahan, Principal of Turners Falls High School, Instructor in Chemistry.
Edward Avis, Bird Lecturer, New York, Instructor in Bird Life.
Edward Howe Forbush, Ornithologist of the Massachusetts State Board of Agriculture, Lecturer in Bird Life.

3. *Course of Study.*

A. COURSES FOR TEACHERS AND OTHERS.

1. Soils and Tillage. — The chemical, physical and biological composition of the soil, and the relation of each to plant growth; the formation of soils; natural and artificial sources of fertility; the methods and implements of tillage; all forming an introduction to modern scientific agriculture.

2. Field Crops. — Class room, laboratory and field exercises designed to show modern methods of managing the principal field crops of New England, such as the grasses, the clovers, corn and potatoes.

3. Fruit Growing. — Modern methods of planting, cultivating, pruning, fertilizing and spraying fruit trees, of planning and managing orchards, and of selling fruit. Lectures, demonstrations and ample field exercises. A thoroughly practical course suited to everybody. Limited to 30 students.

4. Practical Gardening. — This course will consist almost wholly of practical field exercises in planting, training, cultivating, etc.; and though no special effort will be made to put the work into

common school form, the exercises will be specially valuable to school-garden teachers. Course limited to 20 students.

5. Landscape Gardening. — A few elementary problems in landscape gardening, such as the design of school grounds, residence grounds and farm yards, and the fundamental principles governing ornamental planting; principally, however, an exemplification of methods for the use of the common landscape in school work, showing how to make it the basis of practical art instruction in the high school or in the grades.

6. Trees and Shrubs. — A practical course in arboriculture, treating of native and exotic trees and shrubs, and their identification, propagation and culture.

7. Forestry. — Forest species, forest composition, regeneration, management, exploitation, etc., with some attention to the economics of forestry, and with special reference to New England conditions. Those who wish to learn the fundamental facts and principles of the important subject of forestry, but who cannot spare the time for an extended course, will find this course especially adapted to their needs.

8. Domestic Animals. — This very instructive course will deal with the different breeds of farm animals, including poultry, — how to study and judge them, and modern methods of care, sanitation, breeding and feeding. Living domestic animals supply the best of all objects for teaching purposes in primary and intermediate schools, and this course should prove very suggestive to teachers.

9. Dairying. — A course including the latest methods in the production and handling of milk and cream, probably the most important branch of agricultural industry in Massachusetts. The course will be practical rather than theoretical, and will cover, briefly, the composition and secretion of milk; principles and methods of creaming; abnormal milk and its causes; the proper handling of milk and cream on the farm; the value of milk as a food; the relation of milk to the public health; the handling and care of milk in the home; and the methods used in producing sanitary and certified milk.

10. Agricultural Pedagogy. — The general subject of pedagogy will be treated with reference to its vocational aspects. The growth and function of professional and technical schools will be considered, together with the meaning of agriculture in modern education. The course is valuable to all teachers, but is especially recommended to those who teach agricultural or industrial subjects.

11. School Agriculture. — This course is intended for teachers in either the high school or the grammar grades. It will consist of field and laboratory exercises in various departments of practical agriculture and horticulture, following closely the work outlined in the "Bulletin on Public School Agriculture" (address the Department of Agricultural Education of the Massachusetts Agricultural College). The aim of this course is to show, in a concrete manner, just how agricultural subjects may be taught in the public schools. Every exercise will be capable of direct adoption in the ordinary schoolroom.

12. Elementary Chemistry. — An introduction to chemistry, with special reference to agriculture and the industries. The course consists largely of laboratory experiments, and is adapted particularly to the needs of science teachers; but it will be found useful by any one who wishes to know more about this fundamental science.

13. Plant Experiments. — A laboratory course, consisting of simple experiments in plant life with home-made apparatus. A valuable course for science teachers, and an interesting one for any one.

14. Plant Life. — A special study will be made of mushrooms and of ferns, their form, structure and classification. This course is especially suited to the needs of science teachers and amateur botanists.

15. Bird Life. — A study of the local bird fauna, conducted largely in the field. Special attention is given to the economic relations of the birds, and to nesting habits.

16. Insect Life. — An introductory course, planned with especial reference to the needs of teachers in the grade schools and the high schools; the forms selected for particular consideration being those most usually obtainable and of economic importance. The means of recognizing these insects and of checking their ravages will be given especial consideration, and methods of collecting, and of making school collections, will be explained. Special field studies in entomology will also be arranged for those who desire it.

B. Courses especially for Country Clergymen.

17. The practical problems of the New England farmer.
18. The economic problems in American agriculture.
19. The development of the rural community.
20. The relation of the church to the rural community.
21. Forms of co-operation among farmers.
22. Rural literature.

C. COURSES IN DOMESTIC SCIENCE.

23. For rural school teachers.
24. For teachers in city schools, and others interested.
25. For clergymen's wives.

D. NEW COURSES.

The courses described below will be given for the first time in the summer of 1909–10. They are offered in addition to the courses already described.

10. SCHOOL GARDENING. — Lectures in garden work in planning, laying out, planting and cultivating school gardens. Five exercises a week, first two weeks. Professor HART.

14. AGRICULTURAL HIGH SCHOOL CHEMISTRY. — Lectures and experiments which can be used in high school work in applied chemistry of farm and home. Open to those who have had Course 13 or its equivalent.

Mr. MONAHAN and Professor HOWARD.

17. CRYPTOGAMIC BOTANY. — A laboratory course consisting of microscopic and field study of cryptogamic plants. For those who have taken Courses 15 and 16 at former sessions or who have had previous training in botany. Limited to 20 pupils. Two five-hour exercises weekly for two weeks, beginning July 25.

Professor OSMUN.

20. ENTOMOLOGY. — A course of lectures and laboratory work in entomology, more advanced than Course 19. Open to those who have taken Course 19, or its equivalent. Three lectures and 2 laboratory periods for four weeks. Mr. MATHESON.

21. DOMESTIC SCIENCE FOR RURAL SCHOOL TEACHERS. — A course of lectures and practical demonstrations of a very elementary nature in domestic science and home economics. This course will include only such work as would be helpful to, and within the possibilities of, the rural school teacher. Three lectures and 2 cooking demonstrations weekly for four weeks.

Miss RINAKER.

22. DOMESTIC SCIENCE AND HOME ECONOMICS. — A course of a more general nature, covering food problems, — the preparation

of food and the serving of meals. Three lectures and 2 demonstrations weekly for four weeks. Miss RINAKER.

23. HOUSEHOLD SCIENCE. — This course is given especially for the wives of clergymen attending the summer school. Questions of food values, marketing, properly balanced menus, labor-saving devices for the home, etc. Three lectures and 2 demonstrations of cooking weekly, beginning July 25. Miss RINAKER.

24. NEW ENGLAND AGRICULTURE. — An outline of the agricultural situation in New England, considering general conditions, the status of agricultural practice and the farmers' business problems. The course is strongly recommended to clergymen, rural social workers and those interested in the broader aspects of New England agriculture. Five exercises weekly, beginning July 25. Professor HURD.

25. AGRICULTURAL ECONOMICS. — A series of 10 lectures on agriculture considered as an industry and on some of the immediate social and economic problems of the farmer. Some of the topics treated are: The characteristics of the agricultural industry; the relation of agriculture to other industries; the maintenance of the economic position of the farmer; the farmer and the market; co-operative endeavors; organization of the rural social forces. The lectures will deal in a very general and simple way with the problems of farm life, and are designed to give a helpful viewpoint to teachers and leaders in rural communities. Five lectures weekly, beginning July 25. Dr. CANCE.

26. THE DEVELOPMENT OF THE RURAL COMMUNITY. — Ten lectures, discussing briefly the question of community building in rural neighborhoods, community deals, forces to be utilized, and general programs for betterment. Last two weeks. President BUTTERFIELD.

27. THE CHURCH AND THE RURAL PROBLEM. — The course of lectures on "The Church and the Rural Problem" will open with a sketch of the movement which has developed the new interest in the community church. The contribution of the church to the economic and social life will be traced. The special task of the country minister, his difficulties, his problems and his ideals, will be considered. The aim of the lectures will be to show how the

church and the minister may aid, by leading the forces engaged in solving the rural problem. Five lectures weekly, beginning July 25. Mr. ANDERSON.

28. THE COUNTRY SCHOOL AND THE RURAL COMMUNITY. — A course in the problems and management of country schools and the study of rural social forces. This work will begin with a brief general survey of rural school conditions, and a study of their causes. The country teacher's problem and its attack will then be considered in some detail, emphasizing the local leadership of the teacher, showing the influence of the school as an agency of progress in rural development, and treating on its relation to other rural social and educative institutions. Among the topics to receive special attention are: The spiritualization of the school environment; the enrichment and vitalization of the courses of study; consolidation; the chief fundamental needs of the rural school system; the farm home, church, grange and farmers' institute, and their relation to the rural school problem; roads, libraries, telephones, the agricultural press, electric lines and automobiles, and their bearing upon the school situation; and the leadership of the school in the federation and redirection of rural social forces. Lectures beginning August 1. Miss CARNEY.

29. FORMS OF CO-OPERATION AMONG FARMERS. — This course will be a study of the various forms of co-operation among farmers, both in Europe and in the United States, with especial reference to the influence of collected effort on the intelligence, character and status of the farmer. Ten lectures, beginning July 25.

Professor EYERLY.

30. RURAL LITERATURE. — A study of the literature, both prose and poetry, which interprets nature from the viewpoint of the lover of country life, and presents the idealistic side of agriculture and other rural pursuits. Ten lectures, beginning July 25.

Mr. HOLCOMB.

31. THE MOVEMENT IN AGRICULTURAL EDUCATION. — The agencies involved in its promotion; its significance for rural life; its significance for educational theory. Ten lectures, beginning July 25. Professor HART.

4. *Conference for Rural Social Workers.*

The conference for rural social workers (Aug. 9, 10, 11 and 12, 1910) will include sections for rural school teachers, grade teachers of agriculture, high school teachers of agriculture, college teachers of agriculture, rural clergymen, rural librarians, grange lecturers and village improvement societies. These sections will each forenoon meet separately to discuss problems and methods. The afternoons will be devoted to a general session; probably one afternoon to education, another to rural religious life, another to the social agencies that make for better rural progress. Each evening a speaker of international reputation will deliver a lecture on a subject closely allied to the one discussed in the afternoon.

5. *General Information.*

Play and Recreation. — Though the spirit of earnest work predominates in the summer school, yet the necessity of encouraging play and recreation is not overlooked. Amherst is in one of the most historic sections of the country. Mountain and valley, stream and hill, offer ample opportunity for delightful walks and drives, and trolley lines extend in every direction into charming places. Field excursions form an important part of the courses of study. Excursions conducted by members of the faculty are usually made twice weekly to places of interest. Dancing, and tennis, baseball and other athletic contests offer opportunity, for those confined in schoolrooms or offices during the rest of the year, to get relaxation and to recuperate for the next year's work.

Election of Courses. — Election of courses should be made not later than the time of registering. Every election is subject to the approval of the director and of the instructor whose course is elected. As it is necessary to schedule several courses at the same hour, certain combinations of courses will be inevitable. Students should especially notice that certain courses are offered to a limited number only; and as a rule applicants will be accepted in these courses in the order of application. Each student should choose such a combination of courses as will keep two or three subjects in hand at the same time. This will meet the requirement that each student must take not less than ten and not more than fifteen class exercises a week, unless specially permitted to take more or less by the director.

Registration and Attendance. — Those who expect to attend should register as early as possible. A registration fee of $1 will be charged, payable at the time of application, either to the director of the summer school or to the college treasurer. Registration blanks may be had on application. Election of courses should be made at the time of application for registration.

Attendance will be required in the courses elected. The passing of an examination or test, or the presentation of a permanent note-book, will be required in each course. Those who satisfactorily complete their courses, including practically perfect attendance, will be given certificates showing what work has been thus completed.

OTHER MATTERS. — There are no rules nor regulations whatever. Persons are not admitted to the summer school who are not old enough to know how to behave, and every one is expected to know and to conform to the usages of good society. This absence of rules has worked admirably in the past, and it gives every one a sense of freedom based on personal responsibility, the basis of all proper government, whether in school, college or the community.

Tuition is free, and there are no incidental charges. The college is supported by the State and the federal governments, and receives no payments whatever from summer school pupils except for room and board and the registration fee mentioned above.

A bulletin giving full information about living expenses, rooms and board, naming the faculty, and describing the courses of study, will be issued each year about March 1, and can be had by writing to the Director.

D. ITINERANT INSTRUCTION.

1. Correspondence Courses.
2. Lecture Courses.
3. Other Itinerant Instruction.

1. THE CORRESPONDENCE COURSES.

- *a.* Faculty.
- *b.* Purpose and Description of Work.
- *c.* Method of Conducting the Work.
- *d.* Description of the Courses.
- *e.* Additional Information.

a. Faculty of the College, giving the Correspondence Courses.

JAMES A. FOORD, Professor of Farm Administration.
RAY L. GRIBBEN, Instructor in Animal Husbandry.
SIDNEY B. HASKELL, Instructor in Agronomy.
WILLIAM R. HART, Professor of Agricultural Education.
WILLIAM D. HURD, Director of Short Courses.

Floyd B. Jenks, Instructor in Agricultural Education.
William P. B. Lockwood, Assistant Professor of Dairying.
Fred C. Sears, Professor of Pomology.
Charles S. Heller, Instructor in Market Gardening.
Edward A. White, Professor of Floriculture.

b. Purpose and Description of the Work.

The correspondence courses are offered in response to calls from all parts of the State from people who desire agricultural information, but who, for various reasons, cannot come to the college for it. These courses are designed to meet the needs of farmers, dairymen, stock breeders, fruit growers, market gardeners and floriculturists, and of teachers, either in elementary schools, high schools, academies or normal schools.

Since agricultural science and practice have changed, and are changing so rapidly, it is the purpose to give a summary of the latest information on the subjects treated, yet in such language that any who pursue the study can readily understand the work. Additional courses, covering other subjects, will be added later.

c. Method of Conducting the Work.

Though a large number of books have been written on various agricultural subjects, few of them are especially adapted to correspondence course work. For this reason our courses are conducted principally by means of especially prepared lessons. These lessons are somewhat in the nature of the lectures given in the regular college work. Whenever possible, a text-book is used for reference and supplementary study.

The lessons are sent out one at a time, and are either accompanied or followed by a list of questions. When the questions are satisfactorily answered or discussed, the next lesson is sent; and so on.

It is recommended that students take up the work in some logical order, *i.e.,* the courses in "soils" and "manures and fertilizers" should precede those in "field crops," "fruit growing" or "market gardening."

After such preliminary courses have been completed, two or more courses of study may be pursued at the same time, provided the student can devote sufficient time to the work to carry it on satisfactorily.

The courses are especially recommended to granges for study, and it is hoped that grange lecturers and other interested persons will organize study classes. When this is done, a representative of the college will visit the grange from time to time to conduct the class, discuss the work and offer suggestions.

d. Description of Courses.

1. SOIL AND SOIL IMPROVEMENT. — The lessons in this course have been prepared by Prof. William D. Hurd. They treat of soil formation; the different types of soils, their agricultural characteristics and value; the relation of water, heat and air to soils; the improvement of "run-down" land; drainage, tillage, cover crops, crop rotation, etc. The cost of the course is $1.

2. MANURES AND FERTILIZERS. — The lessons in this course have been prepared by Prof. William D. Hurd. They treat of the sources of fertility on the farm; the care, value and management of stable manures, methods of application, etc.; the classification of commercial fertilizers, the characteristics of their different elements, the sources from which the different materials come, their agricultural characteristics, and the selection and mixing of materials for special crops; and the use of lime in agriculture. The cost of the course is $1.

3. FIELD CROPS. — The lessons in this course have been prepared by Mr. Sidney B. Haskell. The course treats of those field and forage crops of importance in New England, and treats of them especially from the viewpoint of the Massachusetts farmer. The crops studied are: maize, the small grains, giving special attention to their use as soiling crops; grasses, clover and alfalfa; and the various "money" crops generally included in a farm rotation. No text-book is used. Instruction is given by means of typewritten lessons, each with a list of questions. It is expected that the student will supplement his study by observation of the farms and farm practice in his immediate neighborhood. The cost of this course is $1.

4. FARM DAIRYING. — The lessons in this course have been prepared by Prof. William P. B. Lockwood. The course consists of several lessons upon the problems of the dairy farm. These lessons include discussions of buildings; of cattle and their care; of feeds and feeding; of the handling and care of milk; the Babcock fat test, hand separators, farm butter making; and markets and marketing. The cost of the course is $1.

5. FRUIT GROWING. — This course has been prepared by Prof. F. C. Sears. It is intended to answer the main questions that arise in carrying on a fruit plantation, from the time the trees are set

until the fruit is marketed. Some of the principal topics will be: selecting the site; choosing the varieties; selecting the trees; laying off and planting the orchard; fertilizing and cultivating, pruning, spraying; cover crops for orchards; harvesting and marketing the fruit. The cost of the course is $1.

6. FRUIT GROWING. — This course has been prepared by Mr. H. F. Thompson. Many times it is of considerable value to have outlined the skeleton upon which a body of knowledge of a subject can be satisfactorily built. With this fact in mind, the instructor has outlined a series of exercises for the work in market gardening, to indicate the fundamental problems of the market gardener. As an aid to this work, Bailey's "Principles of Market Gardening" will be used, supplemented with exercises prepared for this work. The cost of the course, including the text-book, is $2.50.

7. ANIMAL FEEDING. — The lessons in this course have been prepared by Mr. R. L. Gribben. The course takes up the fundamental principles of stock feeding, with their application to specific feeding problems common to New England agriculture. Only the largest domestic animals will be considered, most attention being given dairy stock, — the feeding of sheep, swine and horses being included. The composition, characteristics and selection of feeds will, with the calculation of balanced rations, be important topics of the course. One great aim will be to stimulate discussion of practical problems between the student and instructor. No text-book will be required. The cost of this course is $1.

8. FLORICULTURE. — This course has been prepared by Prof. E. A. White. It is intended to be of service to florists who are desirous of becoming better acquainted with the methods of culture of commercial crops. The course will include twelve lessons on the methods or culture of roses, carnations, violets, chrysanthemums, orchids, bedding plants, bulbs, and other florist crops. The cost of the course is $1.

9. FARM ACCOUNTS. — This course has been prepared by Prof. J. A. Foord. It will consist of a brief study of the principles underlying all bookkeeping, followed by the practical working out in good form of a set of transactions similar to those met with on most New England farms. The system suggested will be simple, one that can be adapted to either the small farm or the large estate. The cost of the course is $1.

10. AGRICULTURE IN THE COMMON SCHOOLS. — The lessons have been prepared, and the course is conducted, by Prof. F. B. Jenks. The course consists of twenty lessons designed to meet the needs

of pupils of the last two years of the grammar school or the first two years of the high school (provided it has not been covered in the grammar school). The work may form the basis for a year's work in either of these grades. A text-book will be used as a guide, but laboratory and field exercises (all of which can easily be done with hand-made apparatus), as well as supplementary reading, will be required. The list of references will include, besides books of prominent writers on agricultural subjects, United States bulletins and year books, and bulletins from the various State experiment stations. The cost of the course, including the text-book, is $2.10.

11. Agricultural Education. — This course has been prepared and is conducted by Prof. William R. Hart. It consists of twenty lessons. The object is to make a study of the current literature upon industrial education, especially such as bears upon the introduction of agriculture into the public schools. It is designed for all those who are interested in the leading questions of current educational discussion. The cost of the course is $1.

e. Additional Information.

Expense Borne by the College. — In order that none shall enroll but those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at the uniform rate of $1 for each course, payable in advance at the time of enrollment. This fee is not charged to cover the cost of preparing the course (for merely in the time of the instructors this cost is many times what is received), but is to defray expenses of postage and of the material used in the preparation of the lessons, and to insure a higher quality of work from those who enroll. The cost of a textbook, when one is used, is added to this enrollment fee. Remittances should be made by money order or check.

Enrollment. — Students may enroll at any time by applying to the Director of Short Courses, either personally or by letter. Enrollment should be made on the card furnished by the college. Membership in the correspondence courses entitles the student to receive, at reduced rates, the books used in the various courses, and others.

List of Reference Books for Supplementary Reading. — For those who desire to add some of the latest books to their libraries, for teachers who wish material for their work or for librarians who desire to place on the shelves of their libraries the latest agricultural publications, arrangements have been made with the

Orange Judd Publishing Company, Lafayette Street, New York City, to supply books at reduced rates. A classified list giving prices (postpaid) will be furnished to all who apply for it.

2. The Lecture Courses.

The college also offers lecture courses. The lectures can be obtained by any agricultural organization, grange, farmers' club, board of trade, women's club, Young Men's Christian Association, church club or school, or by others who are interested in problems pertaining to agriculture and country life. Single lectures, or a series comprising a course, can be arranged for.

Lectures and Subjects. — The faculty of the college are, of course, men busy with regular college duties, and can undertake only so many outside lectures as will not seriously interfere with their regular college work. For this reason it is advisable that those desiring lectures for a fixed date should make a second, and perhaps a third, choice, also, of lecturers, in order to secure some one. Lectures are offered as follows: —

Kenyon L. Butterfield, President of the college: —
- The Mission of the Agricultural College.
- Co-operation for Rural Progress.
- Work of the Commission on Country Life.

William P. Brooks, Director of the Experiment Station: —
- What the Experiment Station does for the Farmer.
- Clover, Corn, Cows, and a Bank Account.
- Japan, its Farms and Farmers (suitable for mixed audiences, with or without stereopticon).
- Poultry Keeping for Egg Production.
- Experiments on the Farm: will they pay? what? how?

E. K. Eyerly, Assistant Professor of Political Science and Lecturer in Rural Sociology: —
- Social Aspects of Co-operation among Farmers.
- Social Need of Organized Agriculture.

Henry T. Fernald, Professor of Entomology: —
- How to control San José Scale.
- Market-garden Pests.
- Our Shade Tree Pests and their Treatment.
- The Insect Enemies of Fruit Trees.

James A. Foord, Professor of Farm Administration: —
- Alfalfa and the Clovers as Sources of Cheap Protein.
- Soil Fertility.
- Corn Growing and Seed Selection.
- The New England Corn Show: how to prepare for it.

Ray L. Gribben, Instructor in Animal Husbandry: —
- Selecting Good Cows.
- Building up a Good Herd.
- New Animal Industries in New England.
- Cow Testing.
- The Feed Problem.

William R. Hart, Professor of Agricultural Education: —
- Elementary Agriculture in the Public Schools.
- Agricultural Education and the Course of Study.
- The Educational Value of Agriculture as a Study.
- What it is to be educated.
- The Function of Agriculture in the Curriculum.
- Boys' and Girls' Agricultural Clubs.

Sidney B. Haskell, Instructor in Agronomy: —
- The Fertilizer Bill and the Clover Crop.
- Some Phases of German Agriculture.
- Grasses and Clovers.
- The Irish Potato.

Henri D. Haskins, in charge Fertilizer Division of the Experiment Station: —
- Selection and Use of Commercial Fertilizers.
- Home-mixed *v.* Factory-mixed Fertilizers.
- The Value of Peat in Agriculture.

William D. Hurd, Director of Short Courses: —
- Commercial Fertilizers from the Standpoint of the Farmer (with object lesson of home mixing).
- Restoration of Fertility to Run-down Land.
- Some Lessons from Maine Potato Growing for Massachusetts Farmers.
- Grass and Clover Production.
- Corn Improvement and Culture.
- The Sanitation of Rural Communities.
- Teaching Agriculture in Secondary Schools (illustrated with stereopticon views).
- Practical Education of the Farmer.
- The Massachusetts Agricultural College: its Organization and Work (illustrated with stereopticon views).

Floyd B. Jenks, Instructor in Agricultural Education: —
- Agriculture in the Schools of Massachusetts.
- Agricultural Education.
- Education of the Farmer's Boy and Girl.
- The Relation of the Home and School Garden to the Work of the School.
- The School Garden: its Plan, Arrangement and Management.

William P. B. Lockwood, Assistant Professor of Dairying: —
- Milk as a Food: its Care in the Home.
- Handling and Care of Milk on the Farm.
- Certified Milk.
- The Babcock Fat Test and its Importance in the Dairy, with Demonstrations of the Test.
- Dairy Farming.

Fred B. McKay, Instructor in Public Speaking and Assistant in English: —
- America's Call to her Youth.
- The Best Animal on the Farm.

James B. Paige, Professor of Veterinary Science: —
- Modern Methods in the Treatment of Disease.
- The Horse's Foot and its Diseases (illustrated by models and specimens).
- Blisters and Boils (blackboard required).
- The Prevention of Animal Disease by Vaccination.
- Stable Ventilation (stereopticon).
- The Conservation of our Poultry Industry.

Fred C. Sears, Professor of Pomology: —
- Personal Experiences in starting a Fruit Farm in Massachusetts.
- The Outlook for Orcharding in New England.
- The Spraying of Fruit Trees.
  - Object Lessons: —
- Pruning Fruit Trees.
- Orchard Spraying.
- Packing Apples.

George E. Stone, Professor of Botany: —
- Cultivation and Care of Shade Trees (stereopticon).
- Village Improvement.
- Diseases of Market-garden Crops.
- Diseases of Farm Crops.
- Diseases of Florists' Crops.
- Diseases of Orchard Crops.
- Agricultural Investigation.
- Bacteria and the Role they play in Agriculture.

Philip H. Smith, in charge of Feed and Dairy Division of the Experiment Station: —
- Commercial Feeds: Results of their Inspection in Massachusetts, and a Discussion of those best suited for Cream and Milk Production.

Harold F. Tompson, Instructor in Market Gardening: —
- The Business of Market Gardening.
- The Home Vegetable Garden.
- Growing Vegetables under Glass.
- From Producer to Consumer, with Suggestions for Marketing Vegetables.
- The School Vegetable Garden.

Edward A. White, Professor of Floriculture: —
- Home Gardens.
- Ornamental Gardens, and Garden Material.
- Development of the Floricultural Industry in Massachusetts.

Charles H. White, Field Agent: —
- The Massachusetts Agricultural College: its Organization and Work (illustrated with stereopticon views).
- Grass Culture for Profit.
- Leadership in the Rural Community.

Frank A. Waugh, Professor of Landscape Gardening: —
- An Art Education on the Farm.
- The Use and Enjoyment of the Landscape.

Village Improvement.
The Improvement of Country Towns.
Suburban Gardening.
American Landscape Gardening.
Dwarf Fruit Trees.

TERMS ON WHICH LECTURES ARE GIVEN. — The purpose in offering lectures to the public is to enable as large a number of the people of the State as is possible to receive the instruction. When no admission fee is charged, the lessons and object lessons will be given free, provided the organization or person requesting the lecture pays the traveling expenses of the lecturer. When an admission fee is charged, the lecturer receives compensation in addition to his traveling expenses. Correspondence is invited regarding the selection of subjects for a course of lectures.

3. OTHER ITINERANT INSTRUCTION.

Besides the correspondence and lecture courses and the practical field demonstrations, the college is carrying on several kinds of itinerant instruction. Calls are constantly made on the college for help to be given at a distance from the institution; and to meet these calls a corps of field agents is being engaged. These men and women will serve as traveling instructors, giving instruction varying in length from a single lecture to traveling-school courses lasting several days. The traveling-school courses really consist of part of the work given at the college in "Farmers' Week," transferred to agricultural centers in the State. The traveling schools last two, three or four days.

Besides traveling schools the work of itinerant instruction in 1910 will be carried on by fitting up educational trains, both on steam railroads and on trolley lines, with educational exhibits. These trains will travel about the State, carrying instructors who will give lectures and demonstrations on agricultural subjects. The instruction undertaken will further include the assembling of educational exhibits to be shown at fairs, in connection with which lectures and demonstrations are given; practical field demonstration of spraying, and demonstration plot tests, duplicating in different parts of the State the work of the experiment station; the establishment of new orchards, and the renovation of old ones by way of demonstration; the carrying on of agricultural surveys, to obtain information that will be useful to the college, by showing the agricultural practices followed in different parts of the State, and what parts of the State are adapted to the different types of farming; the sending of men to help in the selection of land, and to advise about the management of farms; and the helping of the State institutions, and of trustees of estates or trust funds, to manage these in the most approved and economical way.

In short the spirit of the short-course work is that of service, and an effort is made to render the departments of the Massachusetts Agricultural College as helpful to the people of the Commonwealth as they can be. Correspondence is invited from any who desire such help as has been spoken of. Letters should be addressed to the Director of Short Courses, Massachusetts Agricultural College, Amherst, Mass.

GENERAL INFORMATION.

GENERAL INFORMATION.

A. FINANCIAL AND ADMINISTRATIVE.

STUDENT EXPENSES.

TUITION. — Tuition is free to citizens of the United States; but students who are citizens of Massachusetts should apply to the senator of the district in which they live for a free scholarship. Blank application forms may be obtained from the registrar. The tuition charged persons not citizens of the United States is $120 a year.

DORMITORIES AND BOARD. — The college has dormitory accommodation for about 64 students. The rooms in the dormitories are occupied chiefly by the upper classmen, hence new students as a rule are obliged to room in private houses. The rooms in the college dormitories are unfurnished. They are mostly in suites of three, — one study room and two bed rooms. They are heated with steam and lighted with electricity. Students care for their rooms themselves. The rent for each person ranges from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1.50 to $3 a week for each occupant. All correspondence in regard to rooms should be addressed to the dean of the college.

Board can be had at the college dining hall. Good board is furnished at cost. At present the price of board is $3.75 a week. The price is determined by adding to the audited rate of the previous three months' period 5 per cent. At the end of the period, final settlement is made on the basis of actual cost.

EXPENSES.

The necessary college expenses per year are estimated as follows: —

	Low.	High.
Tuition: Citizens of Massachusetts free through State scholarships; other citizens of the United States free; foreigners, $120 a year.		
Room in college dormitories or in private houses, . . .	$39	$110
Board in college dining hall, $3.75 a week, ...	135	135
Laundry, 50 cents to 85 cents a week, ...	18	30
Military uniform, first year, ...	15	15
Laboratory fees, ...	2	20
Books, stationery and other miscellaneous, ...	16	40
	$225	$350

OTHER EXPENSES. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial demands made upon students which they should expect to meet. Chief among these are class assessments, support for the Musical Association and the Y. M. C. A., and taxes levied for maintenance of various student organizations, such as the Social Union, Athletic Association, college "Signal" (paper), etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is assumed by students joining a fraternity. Students rooming in college dormitories are obliged to equip their rooms with furniture. The college assumes no responsibility in regard to the safe-keeping of student furniture in dormitories, either during term time or vacation, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling the economical student will probably spend between $250 and $350 a year.

STUDENT AID.

SELF HELP. — A number of students find opportunities for earning money without depending on the labor fund, and many rely upon labor of some sort to earn their way through college. A few men have paid all their way through college; a great many more have paid a large part of their expenses; and many have earned a small proportion of the cost of their course. But the college recommends that no new student enter without having at least $150 with which to pay his way until he can establish himself at work. The college does not encourage students to enter without money in the expectation of earning their way. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in college, or, instead, to borrow money with which to complete his course. No student should undertake work that interferes with his studies, and students should remember that, owing to the large number of applications for labor-fund employment, no one man can receive a large amount from that source.

LABOR FUND. — An annual appropriation of $7500 for student labor is received from the State. This fund is used only in assisting students who are citizens of Massachusetts and dependent entirely or in part on their own exertions. So far as possible such students will be employed in some department of the college. The Department of Agriculture and the Department of Horticulture usually afford the most work. Application for student labor should be made directly to the president. Applicants must present a certificate signed by parent or guardian and by one of the selectmen of the town in which they reside, showing that they need the aid. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor.

SPECIAL NOTICE TO NEEDY STUDENTS. — *In the last year or two the demand for paid labor on the part of new students has exceeded the amount of employment that the college can offer. The college cannot promise work for any students, particularly freshmen. It accordingly urges prospective students who are dependent upon their own efforts not to undertake the course before they have enough money to carry them through or nearly through the first year.*

STUDENT ACCOUNTS.

The following rules are in force concerning student accounts: —

No student will be allowed to graduate until all bills due from him to the institution are paid.

College charges, such as room rent, laboratory fees, tuition, etc., must be paid strictly in advance at the beginning of each semester. No student will be allowed to register until such payments are made.

Every student boarding at Draper Hall shall pay at the beginning of each semester at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if more than one week in arrears in his payments.

All money due for student labor shall be applied on account toward any bills that the student may owe to the institution.

LABORATORY FEES.

	Per Semester.
Botany: —	
Graduates,	$4 00
Senior year,	3 00
Junior year, first semester,	1 00–3 00
Junior year, second semester,	1 00
Sophomore year, second semester,	3 00
Chemistry: —	
Courses 1, 2, 13 and 14, each,	3 00
Courses 4, 7, 17 and 18, each,	4 00
Courses 5, 6, 15, 17, 18A, 18B and 18C, each,	5 00
Entomology: —	
Seniors,	3 00

	Per Semester.
Landscape gardening: —	
Senior year,	$4 00
Junior year,	2 50
Zoölogy: —	
Sophomore year,	2 00
Other years,	4 00

B. ACADEMIC AND DEPARTMENTAL.

Degrees.

Those who complete the four-years course receive the degree of bachelor of science. Those who receive this degree may also, upon payment of a fee, receive the degree of bachelor of science (B.Sc.) from Boston University (see page 9); but the candidate must meet the conditions imposed by the university concerning preparatory studies. The fee for graduation from the college is $5; that for the degree of Boston University is $10.

Graduate students who complete the assigned courses will receive the degree of master of science (M.Sc.) (fee, $10). Credit may sometimes be allowed toward this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-years course of study and present a satisfactory thesis will be granted the degree of doctor of philosophy (fee, $25).

Those to whom degrees are awarded must present themselves in person at commencement to receive them. Honorary degrees are not conferred.

Scholarships and Prizes.

Scholarships.

The income of gifts from different persons is distributed in scholarships to worthy students requiring aid. The funds supporting these scholarships are: —

1. The Mary Robinson fund of $1,000, the bequest of Miss Mary Robinson of Medfield.
2. The Whiting Street fund of $1,000, the bequest of Whiting Street of Northampton.
3. The Henry Gassett fund of $1,000, the bequest of Henry Gassett of North Weymouth.

Prizes.

Prizes are given annually in several departments for excellence in study or for special achievement. The prizes offered for 1910 are: —

AGRICULTURE.— The Grinnell prizes (first, second and third), given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. They are $25, $15 and $10.

BOTANY. — The Hills prizes (amounting to $35), given by Henry F. Hills of Amherst, will be awarded to members of the senior class as follows: for the best herbarium, $15; for the best collection of Massachusetts trees and shrubs, $10; for the best collection of Massachusetts woods, $10. No collection deemed unworthy of a prize will be considered. In 1911, a prize of $5 is offered to that member of the sophomore class who presents the best herbarium of native flowering plants.

FORESTRY. — The J. W. D. French prize ($25) is given by the Bay State Agricultural Society to that member of the senior class who writes the best essay on forestry.

GENERAL IMPROVEMENT. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who during his first two years in college has shown the greatest improvement in scholarship, character, and example.

PUBLIC SPEAKING. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declamations in the Burnham contest, $15 and $10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, $20 and a gold medal, and $15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, $15 and a gold medal. The preliminary contests in debate are open, under certain restrictions, to all regular students.

Winter Course Prizes for 1910.

Given by the Bowker Fertilizer Company, Boston, to the student who is most familiar with the nature and composition of fertilizers and their use, one-half ton Stockbridge fertilizer.

Military Diplomas.

Military diplomas are given to those men receiving the degree of bachelor of science who by their work in the Department of Military Science have shown themselves worthy of distinction. These diplomas recommend those receiving them for commissions in the United States army or the militia of the several States.

EQUIPMENT.

AGRONOMY. — The work in agronomy is carried on by means of lectures, laboratory work and field work. The laboratories are in the north wing of South College. The seed laboratory is equipped with samples of the different grains and seeds of economic importance in field culture, and with apparatus for the study and testing of these seeds, including microscopes and the apparatus necessary for viability and purity tests. The soil laboratory is well equipped with apparatus for the study of the physical properties of soils, including an electric centrifuge; an electric resistance thermometer for determining soil and other temperatures; evaporimeters and drying ovens; and good balances. For the work in drainage there is available a good surveyor's transit, a wye level and two drainage levels, rods, steel tapes, surveyors' pins, and a set of drainage tools. The college farm may also be considered a part of the agronomy laboratory.

ANIMAL HUSBANDRY. — An important part of the equipment for laboratory work in animal husbandry is the live stock of the college farm, which includes pure-bred and grade Ayrshire, Guernsey, Holstein and Jersey cattle, French coach, Percheron and Clydesdale horses, and Berkshire and Yorkshire swine. A set of plaster-of-paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different food stuffs available for the use of the New England farmer, are included in the equipment for this work.

BOTANY. — The department of botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for sophomore and junior work, and one for senior work; and three rooms specially fitted for graduate students. The experiment station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with all necessary conveniences. The basement contains a bacteriological laboratory, a seed and soil room; and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe, and other tools and appliances. In the senior laboratory is a room designed especially for physiological work; this laboratory is well supplied also with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc. The herbarium contains 15,000 species of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and about 12,000 sheets of fungi. The laboratory is equipped with 90 modern compound microscopes and a number of dissecting microscopes, microtomes and a large series of charts. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experiment work and for housing material often needed in the laboratory.

CHEMISTRY. — The department of chemistry has rooms adapted to chemical uses, supplied with a large assortment of apparatus and chemical materials. The lecture room on the second floor seats 70 students. Immediately adjoining it are four smaller rooms for apparatus and the preparation of materials for the lecture table. The laboratory for beginners is furnished with 40 working-tables. Each table is provided with reagents and apparatus for independent work. A well-equipped laboratory for advanced work is also provided. The weighing room has 6 balances and improved apparatus for determining densities of solids, liquids and gases. The equipment includes also a microscope, a spectroscope, a polariscope, a photometer, a barometer, numerous models, and an extensive collection of industrial charts, and there is a valuable and growing collection of specimens and samples. The latter includes rocks, minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products, and artificial preparations of mineral and organic compounds. With this should also be mentioned a series of preparations used for illustrating the various stages of different manufactures, from raw material to finished product.

DAIRYING. — Two large, well-drained, cement-floored rooms in the South College are used for dairy work. These are equipped with a milk heater, separators, coolers and aërators, a pasteurizer, ripening vats, churns, butter workers, a mechanical can washer, a sterilizer, and other small apparatus necessary to a well-equipped dairy or butter factory. A third room is equipped with hand and power Babcock milk-testing machines and other apparatus used for milk and butter testing. These rooms have individual lockers for students. The new sanitary dairy and stable give an opportunity for practical laboratory work in the production and handling of certified milk.

DINING HALL. — Draper Hall, a brick colonial building, equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college.

DRAWING. — Two rooms on the second floor of Wilder Hall are occupied by the classes in drawing. They are equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details, and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

ENTOMOLOGY. — *Entomological Laboratory.* — The equipment for work in entomology for seniors and for graduate students is unusually good. The laboratory building contains a large room for laboratory work, provided with tables, dissecting and compound microscopes, microtomes, reagents and the usual laboratory implements. One part of the building is fitted up as a lecture room. Another part is devoted to library purposes, and contains a card catalogue of more than 50,000 cards, indexing the literature on insects. Besides the well-selected list of entomological works in this room, there are in the college library an unusual number of rare and valuable books on this subject. These libraries are supplemented by the private libraries of the professors in charge, which contain more than 25,000 volumes, many of which cannot be found elsewhere in the United States. In another room is a large and growing collection of insects, both in the adult and in the early stages. As the laboratory is associated with the insectary of the college experiment station, the facilities of the latter are directly available. The apparatus room of the insectary, with its samples of spray pumps, nozzles and other articles for the practical treatment of insects; the chemical room, fitted for the analysis of insecticides and for other chemico-entomological work; and a greenhouse where plants infected with injurious insects are under continual observation and experimental treatment, are all open to the student; and in addition are provided several private laboratory rooms and a photographing room with an unusually good equipment of cameras. The large greenhouses, grounds, gardens and orchards of the college provide further for study under natural conditions of a wide range of subjects relating to injurious insects.

Farm Administration. — The college farm of 190 acres is under the supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The work in this department includes the production of the common field crops, and the care and raising of the different classes of live stock mentioned under animal husbandry. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied.

Floriculture. — The department of floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a department of floriculture better equipped than this. The legislative appropriation of 1908 has made possible the erection of a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of arboriculture.

GEOLOGY. — The teaching in geology is illustrated with a very complete series of minerals, the State collection of rocks of Massachusetts, a series of Ward's fossils and casts of fossils, and models and charts.

HEATING, LIGHTING AND POWER. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop.

LANDSCAPE GARDENING. — The work in landscape gardening is developed in a strong technical four-years course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for exacting work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

LIBRARY. — The library — stack room, reading room and office — occupies the entire lower floor of the library — chapel building. It contains nearly 32,500 volumes and a large number of pamphlets, hitherto inaccessible, but which are being put into good working order as fast as possible. Works of a scientific character predominate, but economics, literature and history are well represented and are receiving due attention. The reading room provides a variety of periodical literature, both technical and popular, encyclopedias and general reference books, and a selected collection of works for general reading.

The library is now being reclassified and recatalogued, to make the splendid collection of material here gathered together readily accessible and of the greatest working value. Every effort is being made toward developing the library into a vital intellectual center of college life, of equal value to every student, teacher and teaching department. In consequence, only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced.

Lectures are given to regular and short course students to enable them to make the best use of the library. Emphasis is laid upon the proper use of the card catalogue, periodical indexes, bibliographies and guides; also, in general, assigned and class-room work, and essay and debate work.

The library hours are from 7.45 A.M. to 9 P.M. every week day, and from 9 A.M. to 2 P.M. on Sundays, in term time. Shorter hours prevail during vacations.

MARKET GARDENING. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and a laboratory particularly equipped for floriculture and market gardening. A good library of works on vegetable gardening is available.

MATHEMATICS, PHYSICS AND CIVIL ENGINEERING. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 2 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 2 wye levels, a dumpy level, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

Physics. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

MILITARY SCIENCE. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, a recitation room, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

PHYSICAL EDUCATION. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The room used for exercise and recreation is equipped with modern developing apparatus and two hand-ball courts, and is large enough for basket ball. The apparatus can quickly be removed to clear the floor. An out-door board track enables students to secure track practice through the winter. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a model bathroom. The gymnasium is open from 9 A.M. to 10 P.M., and exercise may be taken at such hours as do not conflict with military drill or physical education classes. The regulation costume for class exercise consists of a white track suit and white, rubber-sole shoes.

POMOLOGY. — The department of pomology has 10 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There is also a commercial vineyard and a smaller one; in these are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also extensive nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples and plums in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1908–09, for instance, apples for class use were received from British Columbia, Ontario, Quebec, Nova Scotia, Iowa, Wisconsin, Michigan, Connecticut, New York, Oklahoma, Kansas, Colorado, Oregon, New Jersey, and Vermont, besides collections of grapes from California and citrous fruit from Florida and Texas.

PUBLIC SPEAKING. — In connection with the work in public speaking, three contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests furnish a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Intercollege contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the college Debating Club.

VETERINARY SCIENCE AND BACTERIOLOGY. — The department of veterinary science and bacteriology occupies a modern laboratory and hospital stable, both built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There are a lecture hall, a museum, a demonstration room, a photographing room and a work shop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in bacteriology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

ZOÖLOGY. — A large and well-lighted room in the South College is equipped as a zoölogical laboratory. It has the best apparatus, consisting of microscopes, both simple and compound, a microtome, a paraffin bath, an incubator, dissecting instruments and other necessary apparatus. A reference library which includes the current zoölogical and geological journals is kept in this room, and there are ample aquaria in which living aquatic forms may be studied.

The lecture room is a large room in South College. It is supplied with an electric projection lantern, a set of Leuckart charts, various special charts and a complete set of Auzoux models illustrative of human and comparative anatomy. A special set of topical specimens is used for class illustration, and the more extensive museum collection is drawn upon for the same purpose.

The museum is relied on mainly for specimens illustrating the forms treated of in the lecture and the laboratory courses. In addition to this, the aim has been to show as fully as possible the fauna of Massachusetts, and types that show especially the evolution and the relationship of the members of the animal kingdom. The collection consists of more than 11,000 specimens. The museum is open to the public on Saturdays from 1 to 5 P.M. and on other week days from 2.15 to 4.15 P.M. The curator is Assistant Professor Gordon.

COLLEGE ACTIVITIES.

Religious Services.

Chapel services are held four mornings a week. On Wednesday, instead of chapel an afternoon assembly is held, for which an attempt is made to secure speakers who will present important current subjects. Students are required to attend chapel and assembly.

The Young Men's Christian Association of the college holds a short religious meeting in the chapel on Thursday evenings, and conducts several Bible classes. For part of the year the college and the Y. M. C. A. unite in Sunday vespers, held in the chapel. At vespers a prominent clergyman or layman speaks.

Student Organizations.

A large number of student organizations furnish opportunity for work and leadership to students.

The Massachusetts Agricultural College Social Union has recently been established. All students become members by paying a small fee; the Union is designed to become the center of student interests. It has equipped in North College a trophy room and a large lounging room for music, reading and study. In the basement of this building there is also a game room for pool and billiards. The Union gives, in the fall and winter months, a series of entertainments, free to the students and faculty.

The Young Men's Christian Association is active both socially and religiously.

The College Senate is composed of representatives of the senior and junior classes. It serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The musical organizations include an orchestra, a glee club, and a quartette. These furnish music for college meetings, and occasionally give concerts. A military band is maintained as part of the cadet corps.

The Athletic Association represents in the college the interests of the football, baseball, basketball, track, hockey and tennis teams.

Among the other clubs are the Mettewampe Club, organized for walking and other outdoor recreation, and a debating club. Provision is made for credit for a specified amount of work done under supervision in the Debating Club, and intercollege debates are held. The Public Speaking Council was organized in March, 1910.

The college publications are the "Signal," published weekly by the student body, the "Index," published annually by the junior class, and "The M. A. C. Literary Monthly," just established.

Clubs, Conferences and Seminars.

The All M. A. C. Chemists is an organization of all persons interested in chemistry who have been connected with the college in the past or are now connected with it. This club, by meetings, lectures, excursions, etc., promotes instruction in practical agricultural chemistry.

The Stockbridge Club is an organization of students specially interested in practical agriculture, horticulture and floriculture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

The Language Conference, meeting about once a month, is composed of the instructors in the departments of English and Modern Languages and the students who are enrolled in elective courses in these departments.

A seminar for juniors and seniors is conducted by the division of agriculture. The division of horticulture likewise conducts conferences or seminars.

An entomological club and a zoölogical club are also maintained by those specially interested in these departments of college work.

Honors and Awards — 1909.

Awards and Prizes.

Grinnell Prizes. — To those members of the senior class who passed the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. First prize, $25, to Benjamin Franklin Barnes, Jr., Haverhill, Mass.; second prize, $15, to Paul Edgar Alger, Reading, Mass.; third prize, $10, to Jared Brewer Thomson, Monterey, Mass.

English (Public Speaking) Prizes. — The Flint prizes to those members of the junior class who delivered the best and second best orations. First prize, $30, to William Clarence Johnson, South Framingham, Mass.; second prize, $20, to Roger Sherman Eddy, Dorchester, Mass. The Burnham prizes to freshmen for excellence in declamation. First prize, $25, to Frank Burrows Hills, Bernardston, Mass.; second prize, $20, to Theodore Joseph Moreau, Turners Falls, Mass.; honorable mention, to Edward Burnham Young, Dorchester, Mass.

Entomological Prizes. — To those seniors who have done the best work in entomology during their course, in accordance with the scale of points prepared by the givers of the prizes. First prize, $20, to Donald John Caffrey, Gardner, Mass.; second prize, $10, to George Melvin Codding, Taunton, Mass.

Forestry Prizes. — Given by the Bay State Agricultural Society as the J. W. D. French prize for the best essay on arboriculture. Twenty-five dollars, to Charles Andrew Oertel, South Hadley Falls, Mass.

General Improvement Prize. — Given to that member of the sophomore class who, during his first two years in college, has shown the greatest improvement in scholarship, character and example. Twenty-five dollars, to Percy William Pickard, Hopedale, Mass.

Hills Botanical Prizes. — For the best herbarium, $15, to Waldo Darius Barlow, Amherst, Mass. For the best collection of Massachusetts trees and shrubs, $10, to Waldo Darius Barlow, Amherst, Mass. For the best collection of Massachusetts woods, $10, to Waldo Darius Barlow, Amherst, Mass.

The prize of $5 offered to that member of the freshman class presenting the best herbarium in regular course was awarded to Robert Webster Wales. Honorable mention is made of Edward Hill Bodfish.

Military Honors.

The following officers were reported to the Adjutant-General of the United States and to the Adjutant-General of Massachusetts for their high merit in military work: Maj. Rockwood Chester Lindblad, Capt. Lamert Seymour Corbett, Capt. Henry William Turner, Capt. Richard Chute Potter, Capt. Myron Wood Thompson, Lieut. George Melvin Codding, Lieut. Frederick Chester Warner.

DEGREES CONFERRED AND ROLL OF STUDENTS.

Degrees Conferred—1909.

Doctor of Philosophy.

Hooker, Charles Worcester, Amherst, A.B., Amherst College, 1906.

Bachelor of Science (B.Sc.).

Alger, Paul Edgar,	Reading.
Barlow, Waldo Darius,[1]	Amherst.
Barnes, Benjamin Franklin, Jr.,[1]	Haverhill.
Bartlett, Oscar Christopher,	Westhampton.
Briggs, Orwell Burlton,[1]	Egremont.
Brown, George Murray, Jr.,	Cambridge.
Caffrey, Donald John,[1]	Gardner.
Cardin, Patricio Pennaradonda,[1]	*Artemesia, Cuba.*
Chase, Edward Irving,[1],[2]	Somerville.
Codding, George Melvin,[1],[2]	Taunton.
Corbett, Lamert Seymour,[1],[2]	Jamaica Plain.
Crosby, Harold Parsons,	Lenox.
Crossman, Samuel Sutton,[1],[2]	Needham.
Curran, David Aloysius,[1]	Marlborough.
Cutler, Homer,	Westborough.
Fulton, Gordon Russell,	Lynn.
Geer, Myron Francis,	Springfield.
Geer, Wayne Emroy,	Springfield.
Hathaway, Elmer Francis,[1]	Cambridge.
Hsieh, En-Lung,[1]	*Tientsin, China.*
Hubbard, Arthur Ward,	Sunderland.
Ide, Warren Leroy,[1]	Dudley.
Ingalls, Dorsey Fisher,	Cheshire.
Jen, Haun,[1]	*Tientsin, China.*
Knight, Harry Orrison,	Gardner.
Lindblad, Rockwood Chester,[2]	North Grafton.
MacGown, Guy Ernestus,	*South Britain, Conn.*
Monahan, James Valentine,	South Framingham.
Neale, Harold Johnson,[2]	Worcester.
Noble, Harold Gordon,	Springfield.
Noyes, John,[2]	Roslindale.
O'Grady, James Raphael,	Holliston.
Oliver, John Thomas,	Dorchester.
Phelps, Harold Dwight,	West Springfield.
Potter, Richard Chute,[1],[2]	Concord.
Putnam, Charles Sumner,	Princeton.

---

[1] Boston University diploma.

[2] Military diploma.

Sexton, George Francis,[1]	Worcester.
Shamiae, George Mansour,	*Damascus, Syria.*
Smulyan, Marcus Thomas,	*New York, N. Y.*
Thompson, Myron Wood,[1],[2]	Halifax.
Thomson, Jared Brewer,[1]	Monterey.
Turner, Henry William,[2]	*Trinidad, Cuba.*
Warner, Frederick Chester,[2]	Sunderland.
Waters, Theodore Charles,	*Rocky Hill, Conn.*
Webb, Charles Russell,[2]	Worcester.
Whaley. James Sidney,	*East Orange, N. J.*
White, Charles Howard,[1]	*Providence, R. I.*
White, Herbert Linwood,	*Evansville, Ind.*
Willis, Luther George,	Melrose Highlands.
Wilson, Frank Herbert, Jr.,	Nahant.

Total, 50.

---

[1] Boston University diploma.

[2] Military diploma.

ROLL OF STUDENTS.

GRADUATE STUDENTS. — CANDIDATES FOR A DEGREE.

Bartlett, Oscar Christopher, B.Sc., Massachusetts Agricultural College, 1909.	Westhampton,	R. J. Goldberg's.
Caffrey, Donald John, B.Sc., Massachusetts Agricultural College, 1909.	Gardner,	West Experiment Station.
Chapman, George Henry, B.Sc., Massachusetts Agricultural College, 1907.	Amherst,	Fearing Street.
Davis, Edward Mott, A.B., Harvard, 1909.	Cambridge,	17 Fearing Street.
Davis, Irving Gilman, A.B., Bates, 1906.	*Auburn, Me.*,	12 North College.
Giblin, Edward Michael, A.B., Boston College, 1905.	Holliston,	15 Gray Street.
Holland, Edward Bertram, M.Sc., Massachusetts Agricultural College.	Amherst,	28 North Prospect Street.
Jennison, Harry Milliken, B.Sc., Massachusetts Agricultural College, 1908.	Auburn,	Clark Hall.
Johnson, Frederick Andrew, B.Sc., Massachusetts Agricultural College, 1908.	Graniteville,	84 Pleasant Street.
Merrill, Joseph Henry, B.Sc., Dartmouth, 1905.	Danvers,	9 Fearing Street.
Parker, John Robert, B.Sc., Massachusetts Agricultural College, 1908.	*Poquonock, Conn.*,	96 Pleasant Street.
Regan, William Swift, B.Sc., Massachusetts Agricultural College, 1908.	Northampton,	84 Pleasant Street.
Shaw, Jacob Kingsley, B.Sc., University of Vermont, 1899; M.S., Massachusetts Agricultural College, 1908.	Amherst,	1 Allen Street.
Smith, Philip Henry, B.Sc., Massachusetts Agricultural College, 1897.	Amherst,	102 Main Street.
Summers, John Nicholas, B.Sc., Massachusetts Agricultural College, 1907.	Campello,	66 Pleasant Street.
Toppan, Cushing, A.B., Harvard, 1908.	Cambridge,	– –
Waters, Theodore Charles, B.Sc., Massachusetts Agricultural College, 1909.	*Rocky Hill, Conn.*,	French Hall.
Whitmarsh, Raymond Dean, B.Sc., Massachusetts Agricultural College, 1908,	Amherst,	102 Pleasant Street.

Total, 18.

SENIOR CLASS.

Allen, Rodolphus Harold,[1]	Fall River,	12 South College.
Annis, Ross Evered,	Natick,	14 South College.
Armstrong, Robert Pierson,	*Rutherford, N. J.*,	13 South College.
Bailey, Dexter Edward,	Tewksbury,	88 Pleasant Street.
Bailey, Justus Conant,[1]	Wareham,	Theta Phi House.
Beeman, Francis Stone,	West Brookfield,	Kappa Sigma House.
Blaney, Jonathan Phillips,	Swampscott,	10 South College.
Brandt, Louis,[1]	Everett,	Kappa Sigma House.

---

[1] Work incomplete.

Brooks, Henry Alvan,	*Cleveland, O.,*	16 South College.
Brooks, Sumner Cushing,	Amherst,	M. A. C. Grounds.
Brown, Louis Carmel,	Bridgewater,	9 South College.
Burke, Edward Joseph,[1]	Holyoke,	9 South College.
Clarke, Walter Roe,[1]	*Milton-on-Hudson, N. Y.,*	4 South College.
Cloues, William Arthur,	*Warner, N. H.,*	7 South College.
Cowles, Henry Trask,	Worcester,	Theta Phi House.
Damon, Edward Farnham,[1]	Concord Junction,	18 South College.
Dickinson, Lawrence Sumner,	Amherst,	M. A. C. Grounds.
Eddy, Roger Sherman,	Dorchester,	116 Pleasant Street.
Everson, John Nelson,	Hanover,	2 South College.
Fisk, Raymond John,	Danvers,	Theta Phi House.
Folsom, Josiah Chase,	Billerica,	10 North College.
Francis, Henry Russell,	Dennisport,	5 South College.
French, Horace Wells,	*Pawtucket, R. I.,*	North Amherst.
Haynes, Frank Tuttle,	Sturbridge,	12 South College.
Hayward, Warren Willis,	Millbury,	Care of John Walsh.
Hazen, Myron Smith,	Springfield,	Veterinary Laboratory.
Holland, Arthur Witt,	Shrewsbury,	12 North College.
Hosmer, Charles Irwin,[1]	Turners Falls,	South Dormitory.
Johnson, William Clarence,	South Framingham,	5 South College.
Leonard, William Edward,[1]	Belmont,	10 South College.
McLaine, Leonard Septimus,	*New York, N. Y.,*	4 South College.
Mendum, Samuel Weis,	Roxbury,	Theta Phi House.
Nickless, Fred Parker,	Billerica,	10 North College.
Oertel, Charles Andrew,	South Hadley Falls,	14 North College.
Partridge, Frank Herbert,[1]	Cambridge,	Clark Hall.
Paulsen, George,	*New York, N. Y.,*	2 South College.
Rockwood, Albert Fletcher,[1]	Concord,	17 South College.
Schermerhorn, Lyman Gibbs,	*Kingston, R. I.,*	11 South College.
Thomas, Frank Lincoln,	Athol,	North College.
Titus, Willard McCready Snow,[1]	New Braintree,	16 South College.
Turner, Edward Harrison,[1]	Reading,	6 South College.
Urban, Otto Velorous Taft,	Upton,	Kappa Sigma House.
Vinton, George Newton,	Sturbridge,	East Pleasant Street, at Mrs. Tripp's house.
Waldron, Ralph Augustus,	Hyde Park,	6 South College.
Wallace, William Newton,[1]	Amherst,	6 Phillips Street.

Total, 45.

Junior Class.

Adams, James Fowler,	Melrose,	11 South College.
Allen, Park West,	Westfield,	18 South College.
Armstrong, Ralph Henry,[1]	Holyoke,	75 Pleasant Street.
Baker, Herbert Jonathan,[1]	*Selbyville, Del.,*	4 North College.
Barrows, Raymond Corbin,	*Stafford Springs, Conn.,*	16 North College.
Bean, Thomas Webster,[1]	South Hadley Falls,	75 Pleasant Street.
Bentley, Arnold Gordon,[1]	Hyde Park,	3 North College.
Blaney, Herbert Wardwell,	Swampscott,	Tower, South College.
Brown, Edgar Morton,	Springfield,	96 Pleasant Street.
Burnham, Arthur James,[1]	Holyoke,	75 Pleasant Street.
Bursley, Allyn Parker,	West Barnstable,	Theta Phi House.
Conant, Arthur Theodore,	Sunderland,	Brooks House.
Damon, Charles Murray,[1]	Haydenville,	20 South College.
Davis, Egbert Norton,	South Framingham,	7 North College.
Davis, Irving Wilder,	Lowell,	Insectary.
Drury, Harold Blake,	Athol,	6 North College.
Dudley, John Edward, Jr.,[1]	Newton Center,	11 North College.
Gilgore, Irvin Craig,	*Schenectady, N. Y.,*	3 North College.
Henry, Willard Francis,[1]	Hopedale,	Theta Phi House.
Hill, Nathaniel Herbert,[1]	*Glenmore, N. J.,*	17 South College.
Howe, Harold Hosmer,[1]	Springfield,	Wilder Hall.

---

[1] Work incomplete.

Jenks, Albert Roscoe,[1]	Three Rivers,	Plant House.
Johnson, Leonard Matthews,[1]	Easthampton,	2 North College.
Labouteley, Gaston Edward,[1]	Lynn,	101 Pleasant Street.
Larrabee, Edward Arthur,[1]	Winthrop,	Clark Hall.
Lodge, Charles Albert,[1]	Manchester,	87 Pleasant Street.
McGraw, Frank Dobson,[1]	Fall River,	15 North College.
McLaughlin, Fredrick Adams,	Lee,	4 North College.
Morse, Henry Bowditch,[1]	Salem,	75 Pleasant Street.
Nagai, Isaburo,	*Tokyo, Japan,*	9 North College.
Nickerson, George Payne,	Amherst,	East Experiment Station.
Nielsen, Gustaf Arnold,[1]	West Newton,	15 North College.
Ostrolenk, Bernard,	*Gloversville, N. Y.,*	9 North College.
Parsons, Samuel Reynolds,	North Amherst,	North Amherst.
Patch, Roland Harrison,[1]	Wenham,	35 North Prospect Street.
Pauly, Herman Alfred,	Somerville,	Nash Hall.
Pickard, Percy William,	Hopedale,	18 North College.
Piper, Ralph Waldo,[1]	South Acton,	8 North College.
Prouty, Frank Alvin,[1]	Worcester,	Miss Allen's, Snell Street.
Prouty, Philip Herman,	Shrewsbury,	West Experiment Station.
Racicot, Philias Armand,	Lowell,	15 South College.
Robinson, Ralph Cushing,[1]	Boston,	7 North Dormitory.
Sharpe, Arthur Harris,	Saxonville,	Kappa Sigma House.
Smith, Clarence Albert,[1]	Northampton,	8 North College.
Smith, Raymond Goodale,[1]	Lynn,	3 Fearing Street.
Stevenson, Lomas Oswald,	*Hackensack, N. J.,*	87 Pleasant Street.
Warren, Edward Irving,	Leicester,	13 South College.
Whitney, Raymond Lee,	Brockton,	6 Maple Avenue.
Willard, Harold Francis,	Leominster,	Plant House.
Winn, Ervin Lawrence,	Holden,	87 Pleasant Street.

Total, 50.

SOPHOMORE CLASS.

Ackerman, Arthur John,	Worcester,	5 McClellan Street.
Beals, Carlos Loring,	Sunderland,	Brooks House.
Beers, Rowland Trowbridge,[1]	Billerica,	West Experiment Station.
Bent, William Richard,[1]	Marlborough,	Lover's Lane, The Bungalow.
Birdsall, Webster Jennings,[1]	*Otego, N. Y.,*	28 Lincoln Avenue.
Bodfish, Edward Hill,	West Barnstable,	6 Phillips Street.
Boland, Eric Nichols,	South Boston,	13 Fearing Street.
Brett, Alden Charles,	North Abington,	Kappa Sigma House.
Brown, Merle Raymond,[1]	Greenwich Village,	60 College Street.
Burr, Frederick Huntington,[1]	Worthington,	21 Fearing Street.
Cabot, George Dwight,	Winchester,	79 Pleasant Street.
Caldwell, Lawrence Sanborn,	Lynn,	Kappa Sigma House.
Carpenter, Jesse, Jr.,[1]	Attleborough,	Kappa Sigma House.
Castle, Fred Arlo,	*Kansas City, Mo.,*	East Experiment Station.
Clapp, Raymond Kingsley,	Westhampton,	20 North College.
Curran, Daniel Joseph,	Marlborough,	East Pleasant Street.
Daniel, Edward Stephen Coen,	Osterville,	9 Fearing Street.
Dee, John Francis,[1]	Worcester,	6 Nutting Avenue.
Deming, Winfred Griswold,	*Wethersfield, Conn.,*	6 Nutting Avenue.
Dodge, Albert Wesley,	Wenham,	Mr. Walker's.
Eisenhaure, John Louis,[1]	North Reading,	Nutting Avenue.
Ells, Gordon Waterman,	Cambridge,	44 Triangle Street.
Fagerstrom, Leon Emanuel,	Worcester,	East Pleasant Street.
Fisherdick, Warren Francis,[1]	Amherst,	26 South Pleasant Street.
Fitts, Frank Orus,[1]	North Amherst,	Care of Luther Root.
Fitzgerald, John Joseph,	Holyoke,	33 Elm Street, Holyoke, Mass.
Fowler, George Scott,[1]	Wayland,	85 Pleasant Street.
Frost, John Newton,[1]	Natick,	77 Pleasant Street.
Gallagher, James Andrew,[1]	North Wilmington,	85 Pleasant Street.
Gaskill, Lewis Warren,	Hopedale,	R. J. Goldberg's.

---

[1] Work incomplete.

Gelinas, Louis Edmund,	North Adams,	75 Pleasant Street.
Gibbs, Robert Morey,[1]	Chester,	Brooks Farm.
Gibson, Lester Earle,[1]	Melrose,	85 Pleasant Street.
Gray, Frank Leonard,	East Boston,	21 Fearing Street.
Hallowell, Royal Norton,	Jamaica Plain,	Kappa Sigma House.
Harlow, Joseph Alvin,	Turners Falls,	Kappa Sigma House.
Heald, Jay Morrill,	Watertown,	2 North College.
Hemenway, Thomas,	Winchester,	West Experiment Station.
Hills, Frank Burrows,	Bernardston,	8 South College.
Hickey, Francis Benedict,	Brockton,	5 McClellan Street.
Holland, Henry Lucius,	Amherst,	28 North Prospect Street.
Hutchings, Herbert Colby,	South Amherst,	E. H. Forristall's.
Kingsbury, Arthur French,	Medfield,	20 North College.
Lamson, Robert Ward,	Amherst,	51 Pleasant Street.
Lin, Dau Yang,	*Shanghai, China,*	21 Fearing Street.
Lloyd, Edward Russell,[1]	Boston,	3 Nutting Avenue.
Lowry, Quincy Shaw,[1]	Canton,	85 Pleasant Street.
Lundgren, Arthur Robert,	Orange,	Theta Phi House.
Madison, Francis Spink,	*East Greenwich, R. I.,*	12 Cottage Street.
Martin, James Francis,	Amherst,	19 South East Street.
Maxon, Donald Charles,[1]	*Elkhart, Ind.,*	Sunset Avenue.
McGarr, Thomas Anthony,	Worcester,	31 East Pleasant Street.
Merkle, George Edward,	Amherst,	East Street.
Merrill, Fred Sawyer,	Danvers,	9 Fearing Street.
Moreau, Theodore Joseph,	Turners Falls,	1 North College.
Muller, Alfred Frederick,	Jamaica Plain,	31 East Pleasant Street.
Noyes, Harry Alfred,	Marlborough,	Plant House.
O'Flynn, George Bernhard,	Worcester,	75 Pleasant Street.
Parker, Ralph Robinson,	Malden,	13 North College.
Pearson, Charles Cornish,	Arlington,	6 North College.
Peckham, Curtis,	Clifford,	1 North College.
Philbrick, William Edwin,	Taunton,	5 North College.
Pierpont, John Edward,	Williamsburg,	6 Nutting Avenue.
Pratt, Marshall Cotting,	Lowell,	85 Pleasant Street.
Puffer, Stephen Perry,	North Amherst,	North Amherst.
Raymond, Arthur Nathaniel,	Leominster,	31 East Pleasant Street.
Reed, Robert Edward,	Abington,	Theta Phi House.
Roberts, Clarence Dwight,[1]	*New Haven, Conn.,*	10 Allen Street.
Robinson, Earle Johnson,[1]	Hingham,	116 Pleasant Street.
Rockwood, Lawrence Peck,	*Waterbury, Conn.,*	116 Pleasant Street.
Sanctuary, William Crocker,[1]	Amherst,	Mill Valley.
Sellew, Lewis Raymond,	Natick,	Brooks Farm.
Shaw, Ezra Ingram,	Amherst,	8 Spaulding Street.
Southwick, Benjamin Gilbert,	Buckland,	82 Pleasant Street.
Stack, Herbert James,	Conway,	Pleasant Street.
Terry, Leon,	Springfield,	101 Pleasant Street.
Torrey, Ray Ethan,	North Leverett,	East Pleasant Street.
Tower, Daniel Gordon,	Roxbury,	14 North College.
Tupper, George Wilbur,	Jamaica Plain,	13 North College.
Turner, Howard Archibald,	Dorchester,	East Pleasant Street.
Wales, Robert Webster,	North Abington,	Kappa Sigma House.
Walker, Herman Chester,	Marlborough,	Brooks Farm.
Warner, Roger Andrew,[1]	Sunderland,	E. H. Forristall's.
Weaver, William Jack,	Alandar,	10 Allen Street.
Whitney, Charles Everett,	Wakefield,	Walker's Hall.
Wilbur, Emory Sherman,	East Wareham,	Walker's Hall.
Wilde, Earle Irving,	Taunton,	Kappa Sigma House.
Williams, Edward Roger,	Concord,	116 Pleasant Street.
Williams, Silas,	Fall River,	Theta Phi House.
Wood, Howard Holmes,	Shelburne Falls,	79 Pleasant Street.
Young, Edwin Burnham,[1]	Dorchester,	5 Fearing Street.

Total, 91.

---

[1] Work incomplete.

Freshman Class.

Adams, Winford Frederick,	East Leverett,	2 Allen Street.
Allen, Harry Willis,	West Pelham,	West Pelham.
Ames, Francis Leslie,	Cochituate,	101 Pleasant Street.
Anderson, Oscar Gustaf,	East Pepperell,	85 Pleasant Street.
Angier, Harris William,	Westborough,	77 Pleasant Street.
Baird, Harry Albert,	Somerville,	6 Phillips Street.
Baker, Dean Foster,	New Bedford,	Brooks Farm.
Baker, Horace Mitchell,	*Selbyville, Del.*,	North College.
Baker, Warren Sears,	Wollaston,	75 Pleasant Street.
Barber, George Ware,	Franklin,	116 Pleasant Street.
Blake, Ralph Cedric,	Wollaston,	75 Pleasant Street.
Borden, Ralph James,	Fall River,	1 Allen Street.
Bradley, John Watling,	Groton,	Care of Larned, Pleasant Street.
Brewer, Charlesworth Herbert,	*Mt. Vernon, N. Y.*,	Care of Henry Nash, Pleasant Street.
Brown, Herbert Augustine,	Saxonville,	Brooks Farm.
Bullard, Alvan Henry,	South Framingham,	75 Pleasant Street.
Burby, Lawrence Walter,	Chicopee Falls,	19 Hallock Street.
Bursley, Harold Barrows,	Peabody,	44 Triangle Street.
Caldwell, David Story,	South Byfield,	East Experiment Station.
Carver, John Stuart,	Roslindale,	15 Fearing Street.
Chun, Woon Young,	*Shanghai, China*,	90 Pleasant Street.
Clark, Norman Russell,	Worcester,	66 Pleasant Street.
Clegg, Frank Jackson,	Fall River,	6 Kellogg Avenue.
Cleveland, Waldo Atwood,	Baldwinville,	14 Kellogg Avenue.
Cobb, Joseph Boyd,	Chicopee Falls,	84 Pleasant Street.
Cole, Arlin Tower,	West Chesterfield,	3 Fearing Street.
Coleman, Isaac,	Boston,	8 Walnut Street.
Cooper, Everett Hanson,	Greenwood,	Walker Hall.
Cory, Harold,	*Rutherford, N. J.*,	82 Pleasant Street.
Cowles, Winfred Phelps,	North Hadley,	North Hadley.
Covill, Joseph Warren,	West Roxbury,	Brooks Farm.
Cristman, Clyde Edward,	Dalton,	44 Triangle Street.
Currier, Richard Henry,	*Pelham, N. H.*,	17 Fearing Street.
Curtis, Harold William,	Belchertown,	Belchertown.
Dayton, James Wilson,	*South Norwalk, Conn.*,	25 College Street.
Dohanian, Senekerim Mardiros,	Somerville,	5½ East Pleasant Street.
Dooley, Thomas Patrick,	South Boston,	12 Hallock Street.
Dowd, Daniel Guilford,	North Amherst,	North Amherst.
Drury, Lewis Floyd,	Rutland,	12 East Pleasant Street.
Edminster, Albert Franklin,	*Brooklyn, N. Y.*,	Mount Pleasant.
Ellis, Benjamin Ward,	Plymouth,	120 Pleasant Street.
Everson, Leon Walter,	Bryantville,	44 Triangle Street.
Fay, Robert Sedgwick,	Monson,	120 Pleasant Street.
Finnegan, John Thomas,	Forest Hills,	– –
Forbush, Wallace Clifford,	Rutland,	13 East Pleasant Street.
Freifeld, Joseph,	New Bedford,	8 Walnut Street.
French, James Dudley,	Hyde Park,	116 Pleasant Street.
Fuller, George,	Deerfield,	Amity Street, corner of Lincoln Avenue.
Gaskill, Ralph Hicks,	Worcester,	Brooks Farm.
Godvin, Thomas Joseph,	Jamaica Plain,	35 East Pleasant Street.
Goodenough, Henry Edward,	Wilbraham,	85 Pleasant Street.
Gore, Harold Martin,	Wollaston,	75 Pleasant Street.
Greenleaf, George Freeman,	Brockton,	21 Fearing Street.
Griffin, William Gerald,	South Hadley Falls,	35 East Pleasant Street.
Griggs, Frederick David,	Chicopee Falls,	84 Pleasant Street.
Guild, Louis Franklin,	*Swanton, Vt.*,	E. H. Forristall's.
Harrington, Russell Chase,	Taunton,	58 Pleasant Street.
Harris, Burton Adams,	*Wethersfield, Conn.*,	66 Pleasant Street.

Hasey, Willard Harrison,	Brockton,	5 McClellan Street.
Hatch, Herbert Tilden,	Norwell,	Walker Hall.
Hayden, William Vassall,	Beverly,	3 McClellan Street.
Headle, Herbert Wallace,	Bolton,	A. P. Dings.
Headle, Marshall,	Bolton,	Care of A. P. Dings.
Heath, Chester Blanchard,	Needham,	E. H. Forristall's.
Helberg, Henry William,	Lawrence,	29 McClellan Street.
Holden, James Loomis,	Palmer,	85 Pleasant Street.
Howe, Glover Elbridge;	Marlborough,	75 Pleasant Street.
Howe, Ralph Wesley,	*East Dover, Vt.*,	85 Pleasant Street.
Howlett, Loring Chandler,	Brimfield,	– –
Hubbard, Roswell Earle,	Hatfield,	Wm. Dudley's, Lincoln Avenue.
Huntington, Samuel Percy,	Lynn,	19 Pleasant Street.
Hurley, Charles Andrew,	Brockton,	5 McClellan Street.
Hutchison, Robert B.,	Somerville,	Pleasant Street.
Hyland, Harold Wilson,	Weymouth,	44 Pleasant Street.
Jenks, Harold Edmands,	Worcester,	15 Fearing Street.
Jenney, Herbert Hedge,	South Boston,	1 Allen Street.
Jones, Harold Frederick,	Campello,	5 McClellan Street.
Jordan, Simon Miller,	*Rutherford, N. J.*,	82 Pleasant Street.
Kelley, Albert Joseph,	Roxbury,	35 East Pleasant Street.
Kelley, Bernard Jenkins,	Harwich,	116 Pleasant Street.
Kenney, Frederick Alfred,	Charlestown,	77 Pleasant Street.
Kinney, Warren Clinton.	*West Bridgewater, Conn.*,	120 Pleasant Street.
Lake, James Edward,	Fall River,	Corner of Amity Street and Lincoln Avenue.
Lane, William Francis,	Leominster,	85 Pleasant Street.
Larsen, Nils Paul,	*Bridgeport, Conn.*,	3 McClellan Street.
Lesure, John Warren Thos.,	Lunenburg,	44 Pleasant Street.
Little, Willard Stone,	Newburyport,	120 Pleasant Street.
Lyon, Harold,	Somerville,	79 Pleasant Street.
Macone, Joseph Augustine,	Concord,	116 Pleasant Street.
Mallett, George Alfred,	*Bridgeport, Conn.*,	3 McClellan Street.
Marsh, Frank Eugene,	Jefferson,	Brooks Farm.
Matz, Julius,	Boston,	16 Pleasant Street.
Mayer, John Lawrence,	South Boston,	35 East Pleasant Street.
McDougall, Allister Francis,	Westford,	Brooks Farm.
Milbury, Freeman Cyril,	Lynn,	3 McClellan Street.
Miller, Harold Harrington,	Needham,	E. H. Forristall's.
Moir, William Stuart,	Boston,	3 McClellan Street.
Neal, Ralph Thomas,	Mattapan,	120 Pleasant Street.
Nichols, Norman Joseph,	Everett,	Care of Mrs. L. H. Taylor, North Amherst.
O'Brien, James Leo,	Wayland,	101 Pleasant Street.
Packard, Clyde Monroe,	Springfield,	85 Pleasant Street.
Parsons, Robert,	Lynn,	29 McClellan Street.
Patch, Roy Killam,	Beverly,	3 McClellan Street.
Pease, Lester Newton,	*Meriden, Conn.*,	120 Pleasant Street.
Pellett, John Doubleday,	Worcester,	66 Pleasant Street.
Peters, Thomas Harrison,	North Truro,	77 Pleasant Street.
Pillsbury, Joseph James,	West Bridgewater,	21 Fearing Street.
Post, George Atwell,	*Richmond Hill, N. Y.*,	Theta Phi House.
Prouty, Roy Henry,	Worcester,	Miss Allen's, Snell Street.
Putnam, Earl Francis,	Easthampton,	58 Pleasant Street.
Quinn, Joseph Henry,	Boston,	6 Kellogg Avenue.
Roehrs, Herman Theodore,	*New York, N. Y.*,	85 Pleasant Street.
Rose, Stephen Darwin,	Clifton,	29 McClellan Street.
Rosebrooks, Walter Edwin,	Millbury,	35 East Pleasant Street.
Ryder, Harold Whitman,	East Boston,	21 Fearing Street.
Samson, Stuart Dodge,	*Grand Isle, Vt.*,	19 Phillips Street.
Serex, Paul, Jr.,	Jamaica Plain,	35 East Pleasant Street.
Shea, John Lawrence,	Amherst,	22 McClellan Street.
Sheehan, Dennis Anthony,	South Lincoln,	116 Pleasant Street.

Shute, Carl August,	*Clayton, Ill.,*	9 High Street.
Smart, Herbert Leighton,	Framingham,	Brooks Farm.
Staab, Harold Burton,	Northampton,	85 Pleasant Street.
Streeter, Charles Marsh,	Brimfield,	35 East Pleasant Street.
Thayer, Clark Leonard,	Enfield,	77 Pleasant Street.
Tucker, Waldo Guy,	Lynn,	19 Pleasant Street.
Tupper, Arthur Somerville,	Jamaica Plain,	11 Fearing Street.
Turner, Leon Bennett,	North Abington,	2 Allen Street.
Van Zwaluwenburg, Ryer Herman,	*Rutherford, N. J.,*	66 Pleasant Street.
Walker, Charles Dexter,	Greenwich Village,	120 Pleasant Street.
Wheeler, Henry Leslie,	Salem,	19 Pleasant Street.
Wheeler, Merrill Halladay,	Rutland,	56 South Pleasant Street.
Whitman, Warren Clifford,	Abington,	2 Allen Street.
Whitney, Francis Wellington,	Needham,	E. H. Forristall's.
Zabriskie, George, 2d,	*Rutherford, N. J.,*	82 North Pleasant Street.

Total, 134.

UNCLASSIFIED STUDENTS. — NOT CANDIDATES FOR A DEGREE.

Barstow, Harold Dunbar,	Hadley,	North Amherst.
Critchett, Edward Russell,	Watertown,	120 Pleasant Street.
DeMott, Henry Vroom,	*Metuchen, N. J.,*	2 Allen Street.
Gilmore, Howard Pool,	Waban,	2 Allen Street.
Granger, Helen,	Amherst,	Draper Hall.
Greene, William Allan,	Elmwood,	Mt. Pleasant.
Hammond, Arthur Augustus,	*Bridgeport, Conn.,*	12 Kellogg Avenue.
Hawkins, Guy Carleton,	Lancaster,	66 Pleasant Street.
Lew, Gerard Nelson,	Lowell,	19 North Pleasant Street.
MacDonald, George Francis,	Medford,	– –
Powers, Richard Henry,	Malden,	11 South College.
Roberts, Charles Elliott,	Amherst,	– –

Total, 12.

SHORT COURSE STUDENTS.

Summer School Students — 1909.

Abercrombie, Rev. R. H.,	Windsor.
Adams, Lena R.,	North Brookfield.
Alden, L. F.,	Amherst.
Allen, Rev. Geo. E.,	Williamstown.
Anderson, Mrs. W. L.,	Amherst.
Averill, Eugene,	Rockport.
Bachelder, Grace D.,	Boston.
Barton, Alice M.,	West Roxbury.
Bates, Martha P.,	Cohasset.
Beers, Rev. Charles H.,	*Bantam, Conn.*
Belcher, S. Elizabeth,	Worcester.
Berry, E. K.,	Cambridge.
Berry, J. G.,	Cambridge.
Berry, Carl,	Cambridge.
Bigelow, Charles,	*Hinsdale, N. H.*
Boston, L. B.,	*Biddeford, Me.*
Bray, Maud J.,	Dorchester.
Britt, Emma,	South Boston.
Bristol, Elizabeth D.,	Dana.
Brooks, Laura J.,	Stoneham.
Burgess, Louisa W.,	Dorchester Center.

Busfield, Dr. T. E.,	North Adams.
Callahan, Mary A.,	Worcester.
Callender, Gertrude,	Northfield.
Carley, Lillian M.,	*New York City, N. Y.*
Chace, S. Howard,	Lowell.
Chaney, Florence A.,	Boston.
Chapin, Rev. C. H.,	Phillipston.
Cheney, Hazel Chase,	Amherst.
Childs, Rev. James H.,	Marion.
Churbuck, Bessie L.,	East Wareham.
Connors, Thomas F. L.,	Jefferson.
Coolidge, Kate A.,	South Boston.
Cotta, Florence L.,	Worcester.
Craig, T. C.,	*Wethersfield, Conn.*
Cunningham, M. E.,	Worcester.
Dacey, J. G.,	Dorchester.
Davis, Carrie I.,	Taunton.
Davis, Ethel G.,	Allston.
Davis, Mrs. Sarah J.,	Stoneham.
Day, Geo. W.,	Lynn.
Day, Mrs. Geo. W.,	Lynn.
Dearborn, Helen M.,	Brockton.
DeMott, Henry V.,	*Metuchen, N. J.*
Diman, Elizabeth G.,	Holbrook.
Dooley, Rev. John,	New Boston.
Dorntee, M. Louise,	Malden.
Doty, Alice Lincoln,	Wareham.
Drury, Susan F.,	Everett.
Dudley, Gertrude E.,	Dorchester.
Dunlap, Jennie M.,	Webster.
Durfee, Lydia S.,	*Providence, R. I.*
Eastwood, Wm. Firth,	Roxbury.
Eastwood, Mrs. Wm. F.,	Roxbury.
Eaton, Luella,	Needham Heights.
Ells, Laura A.,	Roxbury.
Faber, Andrew J.,	East Boston.
Farnam, Leah B.,	Malden.
Flaherty, Joseph L.,	Hudson.
Flaherty, Margaret A.,	Worcester.
Flynn, Elizabeth C.,	Malden.
Fogg, Rev. Charles G.,	West Tisbury.
Foley, Ellen L.,	Raynham Center.
Freese, E. P.,	Granby.
French, Geo. W.,	Deerfield.
Fuller, Rev. M. J. B.,	Plainfield.
Gould, Ella F.,	Brockton.
Graham, Rev. John,	Warwick.
Granger, Helen,	Amherst.
Grant, Mrs. Vera A.,	Lawrence.
Graves, Bessie M.,	Southampton.

Gray, J. C.,	*Saco, Me.*
Greene, H. D.,	*Newport, R. I.*
Gushee, W. E.,	Ludlow.
Gustin, Rev. F. B.,	North Amherst.
Habberley, Rev. R. C.,	Otis.
Hadley, Mary E.,	Arlington Heights.
Hall, Rev. Charles H.,	Wakefield.
Hall, George Anthony,	Monterey.
Hall, Lubelle M.,	*Warren, Me.*
Hardon, Henry C.,	Newton.
Harrington, Alona,	Malden.
Haskell, Mabelle W.,	Lynn.
Hayes, Warren C.,	*Durham, N. H.*
Hills, Mrs. Alice T.,	Amherst.
Hills, Susan C.,	Amherst.
Hoagland, Rev. N. S.,	Tyngsborough.
Hogan, Elizabeth H.,	*Unionville, Conn.*
Hopkins, Elizabeth,	Winchester.
Howard, Alice M.,	Taunton.
Howard, Annie G.,	Taunton.
Jeannerett, Georgina,	*Mt. Vernon, N. Y.*
Jenkins, Elizabeth C.,	Sandwich.
Jones, Rev. Gustavus W.,	Winchendon.
Kendrick, Jean,	Amherst.
Keyes, M. R.,	*Kezar Falls, Me.*
Kirby, Lilla B.,	Wellesley Hills.
Landmann, Florence E.,	*Oradell, N. J.*
Lawton, Walter B.,	Athol.
Leanard, Mrs. Maude B.,	Dorchester.
Lewis, John B.,	Huntington.
Lewis, Mrs. John B.,	Huntington.
Lewis, Lillian K.,	Boston.
Lewis, Martha A.,	Boston.
Lockwood, Bertha,	Southfield.
Lockwood, Jennie P.,	Southfield.
Luetge, Mrs. Margaret Werner,	Mattapan.
Lutterman, Rev. E. W.,	Easthampton.
MacIntyre, Katherine,	Provincetown.
Mason, Carrie L.,	Winchester.
Mason, Isadore Helen,	Gardner.
Mattson, W. Frank,	Boston.
Mattson, Mrs. W. Frank,	Boston.
Mattson, Wm. R.,	Brookline.
Mead, Ella,	*Brooklyn, N. Y.*
Miller, Susie T.,	Brockton.
Monk, Anna C.,	Stoughton.
Moulton, Rev. J. W.,	Northbridge Center.
Mowry, Mary E.,	Bernardston.
Mulcahey, Bridget T.,	*Hartford, Conn.*
Munroe, Donald M.,	*Huntington, N. Y.*

Murray, E. Francis,	Cambridge.
Murray, Florence H.,	Cambridge.
Neal, Josephine B.,	Taunton.
Newell, Gordon,	*Millersville, N. Y.*
Newhall, Mrs. Agnes C.,	South Boston.
Newhall, Laura L.,	South Boston.
Newport, Edw. F.,	Amherst.
O'Donnell, Nellie,	*Bridgeton, N. J.*
Olds, Rosabelle M.,	Belchertown.
Parsons, Sally,	Lynn.
Partch, Arthur W.,	Stoneham.
Pennell, Jennie,	*Westbrook, Me.*
Pennell, Mary E.,	*Westbrook, Me.*
Pethybridge, Chas. E.,	Marion.
Poore, Harriet P.,	Boston.
Poore, Mary E.,	Brockton.
Post, Edna A.,	*Gilead, Conn.*
Price, Wm. G.,	*Cappahosic, Va.*
Redding, Charlott W.,	Amherst.
Reynolds, Sybil W.,	*Cumberland Head, Plattsburg, N. Y.*
Riggs, E. J.,	*North Carver.*
Roberts, Ella L.,	Cushman.
Robinson, Mrs. Alice M.,	South Boston.
Robinson, P. J.,	*Littleton, N. H.*
Ross, Mrs. Helen A.,	Brookline.
Rossiter, Irmagarde,	*Hartford, Conn.*
Rowe, Joseph,	Mattapan.
Rowe, Mildred,	Amherst.
Roy, Clista,	Amherst.
Sampson, Mrs. F. D.,	Newton.
Sanborn, A. L.,	Boston.
Sears, J. W.,	*Watha, N. C.*
Shipee, Lydia A.,	*Providence, R. I.*
Spinney, N. B.,	Townsend.
Spooner, Rev. L. C.,	New Marlborough.
Starr, Mrs. L. R.,	Pepperell.
Sullivan, Jane,	Worcester.
Swing, Ella,	*Bridgeton, N. J.*
Teele, Helen M.,	Arlington.
Tobin, Ellen Caroline,	Lawrence.
Torrey, E. E.,	Boston.
Towne, Mrs. Mary E.,	Amherst.
Trowbridge, Anna B.,	Fairhaven.
Tucker, Edward M.,	West Newbury.
Tufts, Mary I.,	Lynn.
Verder, Bessie Clarinda,	Fairhaven.
Verder, Blanche A.,	*Providence, R. I.*
Viets, Rev. F. H.,	West Acton.
Waugh, Dorothy,	Amherst.
Whitcomb, Mrs. Henry F.,	Amherst.

White, Rev. Ralph H.,	Cummington.
Whittaker, B. E.,	*LeRoy, N. Y.*
Whittaker, Mrs. B. E.,	*LeRoy, N. Y.*
Williams, Winnie M.,	Beverly.
Yard, Julia A.,	Sandwich.

Total, 176.

Winter Course Students — 1910.

Alcock, James Richard,	North Amherst.
Baggs, Milton Charles,	Belchertown.
Bahsler, Eugene,	Dunstable.
Barnes, Joseph C.,	Lanesborough.
Belknap, Robert Sidney,	Amherst.
Bowditch, John P.,	Framingham.
Bowser, Lydia Animia,	Cohasset.
Bradstreet, Albert C.,	Topsfield.
Canlett, Thomas Griffith,	Rockport.
Clark, Emerson Leland,	*Milford, Conn.*
Channing, Hayden,	Sherborn.
Childs, Samuel Wellington,	Deerfield.
Cordes, Edward,	Great Barrington.
Cox, Harold Childs,	Wakefield.
Curtis, Elliot D.,	*Bantam, Conn.*
Day, Harry Ney,	West Stockbridge.
Dow, Aaron William,	Bolton.
Dunn, Howard Waterman,	Dorchester.
Eastwood, John Robert,	North Adams.
Edmands, Thomas Roland,	Newton.
Gage, Earl Lyman,	*Gilbertville, N. Y.*
Gray, George Arthur,	Beverly.
Harris, George Browning,	North Adams.
Holcomb, Edmund Alfred,	*Simsbury, Conn.*
Hurd, Robert Otis,	Westminster.
Kenney, Ralph Hewes,	*Greenwich, N. Y.*
Ketchen, Harold Barnett,	Belchertown.
Killam, John,	East Boxford.
Koch, Mabel Tyler (Mrs.),	*Bloomfield, Conn.*
Lanier, Sidney,	Walpole.
Lemoine, Arthur Alfred,	South Framingham.
Lewis, Albert,	*East Rockaway, N. Y.*
Marsh, Howard Clifton,	Arlington.
Maurer, Frank Julius,	Newton.
McCarroll, Edward Loomis,	Waban.
McIntyre, George Henderson,	Easthampton.
O'Donnell, James Curran,	Belchertown.
Pardee, Edwin Curtis,	Bolton.
Pease, Willard Morris,	Monson.
Peck, Harold Frederick,	Belchertown.
Perham, John Franklin,	Ludlow Center.
Priest, Frederick Stimpson,	Watertown.

Puffer, Willis Reynolds,	Concord.
Sabine, George Kraus, Jr.,	Brookline.
Sanderson, Leon Benjamin,	Williamsburg.
Scace, William,	Pittsfield.
Scott, Edwin Gould,	*Garfield, Wash.*
Searle, Edward,	Southampton.
Seaver, John Dwight,	*New Britain, Conn.*
Selkregg, Edwin Reimund,	*North East, Pa.*
Shaughnessy, Thomas Francis,	Marlborough.
Smith, John Anderson,	South Westport.
Smith, Ralph Gibbs,	North Amherst.
Supple, Mark Wellman,	South Deerfield.
Thompson, Paul Ellis,	Brookline.
Torrey, Lewis Edwin,	Southbridge.
Urann, Carl B.,	*Sullivan, Me.*
Valentine, Francis Wadsworth,	Boston.
Valentine, Richard Kirk,	*Erie, Pa.*
Vetter, Rudolf,	North Andover.
Walker, Elbert Lionel,	Savoy Center.
Walker, Rena Lillis,	Savoy Center.
Warfield, Preston George,	Buckland.
Wheeler, George Oscar,	Hudson.
Young, Earl Leonard,	South Hadley.

Total, 64.

Summary by Classes and Courses.

Graduate students,		18
Senior class,	45	
Junior class,	50	
Sophomore class,	91	
Freshman class,	134	
Unclassified,	12	
		332
		350
Short courses: —		
Summer school, 1909,	176	
Winter courses, 1910,	64	
		240
		590
Counted twice,		2
Total,		588

Geographical Summary.

Massachusetts,	499
Connecticut,	21
New York,	21
New Jersey,	11

Rhode Island,	7
Maine,	7
New Hampshire,	5
Vermont,	3
Delaware,	2
Pennsylvania,	2
Indiana,	1
Illinois,	1
Missouri,	1
North Carolina,	1
Ohio,	1
Virginia,	1
Washington,	1
China,	2
Japan,	1
Total,	588

ALUMNI ASSOCIATIONS AND CLASS SECRETARIES.

ALUMNI ASSOCIATIONS.

The Associate Alumni of the Massachusetts Agricultural College.
President, H. J. WHEELER, '83, Kingston, R. I.
Secretary, S. B. HASKELL, '04, Amherst, Mass.

The Local Alumni Association of the Massachusetts Agricultural College.
President, DAVID BARRY, '90, Amherst, Mass.
Secretary, SIDNEY B. HASKELL, '04, Amherst, Mass.

The Alumni Club of Massachusetts.
President, F. W. DAVIS, '89, Roslindale, Mass.
Secretary, H. W. DANA, '99, Salem, Mass.

The Connecticut Valley Association of the Massachusetts Agricultural College Alumni.
President, G. A. PARKER, '76, Hartford, Conn.
Secretary, WALTER B. HATCH, '05, Hartford, Conn.

The Massachusetts Agricultural College Club of New York.
President, A. W. LUBLIN, '84.
Secretary, DR. JOHN A. CUTTER, '82, 325 West Eighty-third Street, New York, N. Y.

The Massachusetts Agricultural Club of Washington, D. C.
President, A. F. BURGESS, '95, 1358 Newton Street, Washington, D. C.
Secretary, F. D. COUDEN, '04, 1310 Columbia Road, Washington, D. C.

The Western Alumni Association of the Massachusetts Agricultural College.
President, A. B. SMITH, '95, 544 Winnemac Avenue, Chicago, Ill.
Secretary, M. H. WEST, '03, 28 Lindon Court, Chicago, Ill.

Class Secretaries.

Class of	SECRETARY.	Secretary's address.
1871	E. E. Thompson, . .	Worcester, Mass.
1872	S. T. Maynard, . .	Northborough, Mass.
1873	C. Wellington, . .	Amherst, Mass.
1874	– –	– –
1875	M. Bunker, . . .	Newton, Mass.
1876	C. Fred Deuel, . .	Amherst, Mass.
1877	– –	– –
1878	C. O. Lovell, . . .	48 Summer Street, Boston, Mass.
1879	R. S. Swan, . . .	Worcester, Mass.
1880	– –	– –
1881	J. L. Hills, . . .	Burlington, Vt.
1882	G. D. Howe, . . .	Bangor, Me.
1883	J. B. Lindsey, . .	Amherst, Mass.
1884	L. Smith, . . .	25 Mercantile Street, Worcester, Mass.
1885	E. W. Allen, . .	Washington, D. C.
1886	Dr. Winfield Ayres, .	616 Madison Avenue, New York, N. Y.
1887	F. H. Fowler, . .	Shirley, Mass.
1888	H. C. Bliss, . . .	Attleborough, Mass.
1889	C. S. Crocker, . .	25 South Van Pelt Street, Philadelphia, Pa.
1890	F. W. Mossman, . .	Westminster, Mass.
1891	H. T. Shores, . .	Northampton, Mass.
1892	H. M. Thomson, . .	Amherst, Mass.
1893	F. A. Smith, . . .	Ipswich, Mass.
1894	S. F. Howard, . .	Amherst, Mass.
1895	H. A. Ballou, . .	Barbadoes, W. I.
1896	– –	– –
1897	C. A. Peters, . .	Moscow, Idaho.
1898	– –	– –
1899	D. A. Beaman, . .	Ponce, Porto Rico.
1900	E. K. Atkins, . .	Northampton, Mass.
1901	J. H. Chickering, . .	Dover, Mass.
1902	H. L. Knight, . .	1731 T Street, Washington, D. C.
1903	G. D. Jones, . . .	North Amherst, Mass.
1904	P. F. Staples, . .	North Grafton, Mass.
1905	P. F. Williams, . .	Auburn, Ala.
1906	Richard Wellington, .	Geneva, N. Y.
1907	J. N. Summers, . .	Amherst, Mass.
1908	Jas. A. Hyslop, . .	205 D Street, Washington, D. C.

INDEX.

PAGE
Admission 23–37
Advanced standing 35
Agricultural education . . . 41
Agriculture 42
Agronomy 43
Alumni organizations . . . 156
Animal husbandry 44
Attendance, summary of . . . 154
Awards. (See Honors.)

Bacteriology 79
Botany 47, 87

Calendar 7
Certificates, admission on . . 23
Chemistry 49, 87
Civil engineering 71, 72
Clubs, etc. 134–136
College officers 14–16
Committees of faculty . . . 19
Corporation 12
Correspondence courses . . . 109
Courses of instruction:
  Undergraduate 38–80
  Graduate 81–90

Dairying 45
Degrees conferred 141
Dormitories 121
Drawing 60

Economics 69, 76–78
English 61–66
Entomology 54, 88
Entrance. (See Admission.)
Equipment of departments . . 126
Examinations, entrance . . . 23–25
Expenses 121
Experiment station 11, 17

Faculty 14
Faculty committees 19
Farm administration . . . 46
Fellowships. (See Scholarships.)
Floriculture 58
Forestry 57
French 66

General information . . . 121–137
Geology 80
German 67
Government 69
Graduate school 83

History 69–70
Honors 136

PAGE
Horticulture 55, 89
Humanities 61
Hygiene 75

Itinerant instruction 109

Journalism 62

Landscape gardening 59
Languages, modern European. (See French, German, Spanish.)
Law 78
Library 130
Literature 61–66

Market gardening 60
Massachusetts Agricultural College 9
Massachusetts Agricultural Experiment Station 11
Mathematics 70
Military science 72
Music 68

Organizations, student . . . 135

Physical education 75
Physics 71, 72
Political science 69
Pomology 57
Prizes 124–126
Public speaking 65

Religious services 134
Roll of students 143
Rural social science 76

Scholarships 124
Short courses 91
Sociology 69, 78
Spanish 67
Student expenses 121
Students, roll of 143
Summer school 100

Table of undergraduate subjects . 34–36
Trustees, etc. 12

Unclassified students 36
Undergraduate courses . . . 38–71

Veterinary science 79

Winter school 94

Zoölogy 79, 90

78.74
MaH1

THE M. A. C. BULLETIN
AMHERST, MASS.
Vol. III. No. 2. For February, 1911.
Published Six Times a Year by the College.
Jan., Feb., Mar., May, Sept., Oct.
ENTERED AS SECOND-CLASS MAIL MATTER AT THE POST OFFICE, AMHERST, MASS.

Public Document No. 31

CATALOGUE

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE,

1910-1911.

FORTY-EIGHTH ANNUAL REPORT.

PART II.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1911.

Without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. — *Act of Congress, July 2, 1862.*

MASSACHUSETTS AGRICULTURAL COLLEGE,

AMHERST.

CATALOGUE, 1910-1911.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1911.

Approved by
The State Board of Publication.

Vacations and holidays are indicated by light-faced type.

1910.

JULY.

S	M	T	W	Th	F	S
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

AUGUST.

S	M	T	W	Th	F	S
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

SEPTEMBER.

S	M	T	W	Th	F	S
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	..
..	..	..	..	..	..	..

OCTOBER.

S	M	T	W	Th	F	S
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

NOVEMBER.

S	M	T	W	Th	F	S
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	..	..	..
..	..	..	..	..	..	..

DECEMBER.

S	M	T	W	Th	F	S
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
..	..	..	..	..	..	..

1911.

JANUARY.

S	M	T	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..
..	..	..	..	..	..	..

FEBRUARY.

S	M	T	W	Th	F	S
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	..	..	..	..
..	..	..	..	..	..	..

MARCH.

S	M	T	W	Th	F	S
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..
..	..	..	..	..	..	..

APRIL.

S	M	T	W	Th	F	S
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	..	..	..	..	..	..

MAY.

S	M	T	W	Th	F	S
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

JUNE.

S	M	T	W	Th	F	S
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	..
..	..	..	..	..	..	..

JULY.

S	M	T	W	Th	F	S
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

AUGUST.

S	M	T	W	Th	F	S
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..	..	..	..	..	..	..

SEPTEMBER.

S	M	T	W	Th	F	S
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
..	..	..	..	..	..	..

OCTOBER.

S	M	T	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..
..	..	..	..	..	..	..

NOVEMBER.

S	M	T	W	Th	F	S
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	..	..
..	..	..	..	..	..	..

DECEMBER.

S	M	T	W	Th	F	S
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

1912.

JANUARY.

S	M	T	W	Th	F	S
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

FEBRUARY.

S	M	T	W	Th	F	S
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	..	..
..	..	..	..	..	..	..

MARCH.

S	M	T	W	Th	F	S
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

APRIL.

S	M	T	W	Th	F	S
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	..	..	..	..
..	..	..	..	..	..	..

MAY.

S	M	T	W	Th	F	S
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..
..	..	..	..	..	..	..

JUNE.

S	M	T	W	Th	F	S
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	..	..	..	..	..	..

THE MASSACHUSETTS
AGRICULTURAL COLLEGE.

Beginning with this issue, the catalogue represents a statement of the courses of study, and the status of the college, for the current college year, unless the contrary is indicated in the text. Announcement of changes affecting the work of the following year will be made later.

CALENDAR.

1911-1912.

REGULAR COURSES.

1911.

January 2, Monday, 1 P.M.,	Winter recess ends; chapel.
January 30, Monday,	Semester examinations begin.
February 6, Monday, 1 P.M.,	Second semester begins; chapel.
February 22, Wednesday,	Half holiday, Washington's Birthday.
March 24, Friday, 6 P.M.,	Spring recess begins.
April 3, Monday, 1 P.M.,	Spring recess ends; chapel.
April 19, Wednesday,	Half holiday, Patriot's Day.
May 30, Tuesday,	Holiday, Memorial Day.
June 5, Monday,	Senior examinations begin.
June 12, Monday,	Non-senior examinations begin.
June 17–21, Saturday–Wednesday,	Commencement.
June 21–24, Wednesday–Saturday,	Entrance examinations.

Summer Vacation.

September 11–13, Monday–Wednesday,	Condition examinations.
September 11–14, Monday–Thursday,	Entrance examinations.
September 13, Wednesday, 1.30 P.M.,	First semester begins; assembly.
October 12, Thursday,	Half holiday, Columbus Day.
November 29–December 4, Wednesday, 1 P.M.–Monday, 1 P.M., chapel,	Thanksgiving recess.
December 15, Friday, 6 P.M.,	Winter recess begins.

1912.

January 1, Monday, 1 P.M.,	Winter recess ends; chapel.
January 29, Monday,	Semester examinations begin.
February 5, Monday, 1 P.M.,	Second semester begins; chapel.
February 22, Thursday,	Half holiday, Washington's Birthday.
March 29, Friday, 6 P.M.,	Spring recess begins.
April 8, Monday, 1 P.M.,	Spring recess ends; chapel.
April 19, Friday,	Half holiday, Patriot's Day.
May 30, Thursday,	Holiday, Memorial Day.
June 3, Monday,	Senior examinations begin.
June 10, Monday,	Non-senior examinations begin.
June 15–19, Saturday–Wednesday,	Commencement.
June 19–22, Wednesday–Saturday,	Entrance examinations.

SHORT COURSES, 1911.

Ten weeks' general course, January 3–March 10.

Two weeks' course in poultry management, February 26–March 10.

Farmers' week, March 13–March 17.

Beekeeping course, May 24–June 7.

Summer school begins July 3.

MASSACHUSETTS AGRICULTURAL COLLEGE.

ERRATA AND ADDENDA.

Page 15. — After " Guy Chester Crampton," insert " J. C. Graham, B.Sc., Associate Professor of Poultry Husbandry, beginning Feb. 15, 1911."

Page 16. — " Marcus T. Smulyan " (not Smulyou); the name should appear under " Graduate Assistants."

Page 17. — Under " Additional Instructors," omit name of " J. W. Wellman."

Pages 41, 42. — The tables state inaccurately the credits in freshman, sophomore and junior physical education and military science. These credits should be: —

Freshman Year. — Semester 1: Drill, 1 hour. Semester 2: Drill, 1 hour; Physical Education, 1 hour.

Sophomore and Junior Year (Each). — Semester 1: Drill, 1 hour; Tactics, 1 hour. Semester 2: Drill, 1 hour; Tactics, 1 hour; Physical Education, 1 hour.

The footings of the credit-hour columns should therefore read: —

Freshman Year. — Semester 1, 18 or 19.

Sophomore Year. — Semester 2, 20 or 18.

Page 57. — *Department of Entomology.* In name-list, after " Professor Fernald," insert " Associate Professor Crampton."

Page 64, footnote 2. — Add " Stephen Hamblin (second semester)."

Page 79. — *Department of Rural Social Science.* To name-list add " Mr. Holcomb."

Page 82. — *Department of Veterinary Science.* To name-list add " Mr. Larsen."

MASSACHUSETTS AGRICULTURAL COLLEGE.

HISTORY. — The Massachusetts Agricultural College was among the colleges organized under the national land grant act of 1862. This act gave public lands to the several States and Territories for the establishment of colleges for the benefit of agriculture and the mechanic arts; it was framed by the late Senator Justin Smith Morrill of Vermont. For our own college, liberal appropriations are also made by the Legislature of Massachusetts.

The college was incorporated in 1863, and on the 2d of October, 1867, was formally opened to an entering class of 33. In January, 1875, an arrangement was made with the authorities of Boston University under which the college, without losing its independence, became the school of agriculture of the university. Under this arrangement, graduates of the Massachusetts Agricultural College may, upon certain conditions, receive the diploma in science awarded to graduates of the university. In 1882 the State experiment station was located at the college. It has since been incorporated with the college.

COURSES. — The college offers a free education to any American student who may fulfill the requirements of admission. Women are admitted on the same standing as men. Foreign students pay a tuition fee. The four-years course leads to the degree of bachelor of science, and graduate courses are given leading to the degrees of master of science and of doctor of philosophy. Winter courses of ten weeks are offered, and, upon announcement, special courses. There is also a summer school of agriculture, designed chiefly for persons desiring to teach agriculture in the elementary and high schools.

PURPOSE OF THE COLLEGE. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement, the term "agricultural" is used in the broadest sense. Courses are offered which give efficiency in various practical pursuits, such as general farming, dairying, the management of estates, fruit growing, glass farming, landscape gardening, forestry and arboriculture. Students also qualify for positions in institutions designed for investigation in the many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, and for business occupations having connection with the farm and needing expert service.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences — particularly chemistry, physics, mathematics and engineering — are an essential preparation. Still other students find the course a splendid general education, without regard to future occupation. The course is well balanced; each student is required to study English, a modern foreign language, literature, political science and history.

Location and Equipment. — Situated in the beautiful town of Amherst, the college has an inspiring outlook. The campus is especially attractive. The grounds comprise more than 475 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst, 97 miles west of Boston, is on the Central Vermont Railroad and the Central Massachusetts division of the Boston & Maine Railroad. Electric car lines connect the village with Northampton, Holyoke, Springfield and other cities. The town library is open to students, in addition to the college library, as are also good courses of lectures and concerts in the village, supplementing the various interests of college life.

THE MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college. It was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about two-fifths of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to the committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, extension work and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

The Corporation.

Members of the Corporation.

	TERM EXPIRES
Davis R. Dewey of Cambridge,	1912
M. Fayette Dickinson of Brookline,	1912
William H. Bowker of Concord,	1913
George H. Ellis of West Newton,	1913
Charles E. Ward of Buckland,	1914
Elmer D. Howe of Marlborough,	1914
Nathaniel I. Bowditch of Framingham,	1915
William Wheeler of Concord,	1915
Arthur G. Pollard of Lowell,	1916
Charles A. Gleason of New Braintree,	1916
Frank Gerrett of Greenfield,	1917
Harold L. Frost of Arlington,	1917
Charles H. Preston of Danvers,	1918
Frank A. Hosmer of Amherst,	1918

Members Ex Officio.

His Excellency Governor Eugene N. Foss, *President of the Corporation.*
Kenyon L. Butterfield, *President of the College.*
David Snedden, *State Commissioner of Education.*
J. Lewis Ellsworth, *Secretary of the State Board of Agriculture.*

Officers of the Corporation.

His Excellency Governor Eugene N. Foss of Boston, *President.*
Charles A. Gleason of Springfield, *Vice-President.*
J. Lewis Ellsworth of Worcester, *Secretary.*
Fred C. Kenney of Amherst, *Treasurer.*
Charles A. Gleason of Springfield, *Auditor.*

Standing Committees of the Corporation.[1]

Committee on Finance.

Charles A. Gleason, *Chairman.*
George H. Ellis.
Nathaniel I. Bowditch.
Arthur G. Pollard.
Charles E. Ward.
Frank A. Hosmer.

---

[1] The president of the college is ex officio member and secretary of standing committees. The director of the experiment station is a member of the committee on experiment department, without vote.

Committee on Course of Study and Faculty.

William Wheeler, *Chairman.*
William H. Bowker.
M. Fayette Dickinson.
David Snedden.
Elmer D. Howe.
Davis R. Dewey.
Frank A. Hosmer.

Committee on Farm.

George H. Ellis, *Chairman.*
Frank Gerrett.
Charles A. Gleason.
Nathaniel I. Bowditch.

Committee on Horticulture.

J. Lewis Ellsworth, *Chairman.*
Davis R. Dewey.
Elmer D. Howe.
Harold L. Frost.

Committee on Experiment Department.

Charles H. Preston, *Chairman.*
J. Lewis Ellsworth.
Arthur G. Pollard.
Charles E. Ward.
Harold L. Frost.

Committee on Buildings and Arrangement of Grounds.

M. Fayette Dickinson, *Chairman.*
William Wheeler.
Frank Gerrett.
William H. Bowker.
Charles H. Preston.

Examining Committee of Overseers.

John Bursley of West Barnstable.
Isaac Damon of Wayland.
N. B. Turner of Great Barrington.
Frank P. Newkirk of Easthampton.
William E. Patrick of Warren.

OFFICERS OF THE INSTITUTION.

THE FACULTY.

[The names of the faculty are arranged in groups according to rank. Within these groups the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held.]

KENYON L. BUTTERFIELD, A.M., LL.D., . . . President's House.
President of the College and Professor of Rural Sociology.

GEORGE F. MILLS,[1] M.A., ... 46 Amity Street.
Dean of the College, Head of the Division of the Humanities and Professor of Languages and Literature.

CHARLES H. FERNALD, Ph.D., ... 3 Hallock Street.
Honorary Director of the Graduate School.

WILLIAM P. BROOKS, Ph.D., ... 28 Northampton Road.
Director of the Experiment Station and Lecturer on Soil Fertility.

WILLIAM D. HURD, M.Agr., ... 82 Pleasant Street.
Director of Extension Work.

FRANK A. WAUGH, M.Sc., . . . Massachusetts Agricultural College.
Head of the Division of Horticulture and Professor of Landscape Gardening.

JAMES A. FOORD, M.Sc., ... Nutting Avenue.
Head of the Division of Agriculture and Professor of Farm Administration.

CHARLES WELLINGTON, Ph.D., ... 34 Amity Street.
Professor of General and Agricultural Chemistry.

JAMES B. PAIGE, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Professor of Veterinary Science, and Acting Dean.

GEORGE E. STONE, Ph.D., ... Mount Pleasant.
Professor of Botany.

JOHN E. OSTRANDER, A.M., C.E., ... 33 North Prospect Street.
Professor of Mathematics and Civil Engineering.

HENRY T. FERNALD, Ph.D., ... 44 Amity Street.
Acting Director of the Graduate School and Professor of Entomology.

GEORGE C. MARTIN, C.E., Captain, 18th U. S. Infantry,
35 North Prospect Street.
Professor of Military Science and Tactics.

EDWARD A. WHITE, B.Sc., ... Mount Pleasant.
Professor of Floriculture.

WILLIAM R. HART, A.M., ... 97 Pleasant Street.
Professor of Agricultural Education.

FRED C. SEARS, M.Sc., ... Mount Pleasant.
Professor of Pomology.

---

[1] Absent on leave.

Fred C. Kenney, Mount Pleasant.
Treasurer of the College.

Philip B. Hasbrouck, B.Sc., 130 Pleasant Street.
Registrar of the College, Associate Professor of Mathematics and Adjunct Professor of Physics.

Robert Wilson Neal, A.M., 7 Woodside Avenue.
Associate Professor of English.

Joseph S. Chamberlain, Ph.D., 16 North Prospect Street.
Associate Professor of Chemistry.

William P. B. Lockwood, B.Sc.Agr., 5 East Pleasant Street.
Associate Professor of Dairying.

Frank F. Moon, B.A., M.F., 6 Allen Street.
Associate Professor of Forestry.

John Allen McLean,[1] B.A., B.S., A., —— ——
Associate Professor of Animal Husbandry.

Guy Chester Crampton,[2] Ph.D., —— ——
Associate Professor of Entomology.

S. Francis Howard, M.Sc., 10 Allen Street.
Assistant Professor of Chemistry.

A. Vincent Osmun, M.Sc., North Amherst, Mass.
Assistant Professor of Botany.

Sidney B. Haskell, B.Sc., 5 Fearing Street.
Assistant Professor of Agronomy.

Clarence E. Gordon, A.M., North Amherst, Mass.
Assistant Professor of Zoölogy and Geology.

Percy L. Reynolds, M.D., 17 Fearing Street.
Assistant Professor of Physical Education and Hygiene.

Floyd B. Jenks, B.Sc.Agr., North Adams, Mass.
Assistant Professor of Agricultural Education.

Alexander E. Cance, Ph.D., 9 Fearing Street.
Assistant Professor of Agricultural Economics.

Frederick B. McKay, A.B., 12 Cottage Street.
Assistant Professor of English and Public Speaking.

Elmer K. Eyerly, A.M., North Amherst, Mass.
Assistant Professor of Political Science and Lecturer in Rural Sociology.

Burton N. Gates, Ph.D., 42 Lincoln Avenue.
Assistant Professor of Beekeeping.

George N. Holcomb, A.B., S.T.B., South Amherst, Mass.
Lecturer in History.

Frank W. Rane, Boston, Mass.
Lecturer in Forestry.

Ray L. Gribben,[3] B.Sc.Agr., 66 Pleasant Street.
Instructor in Animal Husbandry.

Edgar L. Ashley, A.M., Prospect House.
Instructor in German.

Anderson A. Mackimmie, A.B., Nutting Avenue.
Instructor in French and Spanish, Assistant to the Dean.

C. Robert Duncan, B.Sc., 46 Pleasant Street.
Instructor in Mathematics and Physics.

---

[1] Beginning with second semester.

[2] Beginning April 1, 1911.

[3] Resigned Jan. 20, 1911.

Charles R. Green, B.Agr., ... Mount Pleasant.
Librarian.
Charles S. Heller, ... 1 Allen Street.
Instructor in Market Gardening.
Alvah J. Norman, B.Sc., ... Phillips Street.
Instructor in Pomology.
Charles J. Robinson, B.Sc., ... Lincoln Block.
Instructor in Dairying and Animal Husbandry.
John Noyes, B.Sc., ... Wilder Hall.
Assistant in Landscape Gardening.
W. A. Turner, Ph.B., ... 34 Amity Street.
Assistant in Chemistry.
Alfred Larsen, B.Sc., ... —— ——
Assistant in Bacteriology.
Marcus T. Smulyou, ... —— ——
Graduate Assistant in Botany.
Miss Helena Goessmann, ... Amity Street.
Assistant in English.

Graduate Assistants.

John N. Summers, B.Sc., ... 66 Pleasant Street.
Assistant in Entomology.
Leonard S. McLaine, B.Sc., ... 84 Pleasant Street.
Assistant in Zoölogy.

Other College Officers.

Edwin H. Forristall, M.Sc., . . Massachusetts Agricultural College.
Farm Superintendent.
Ralph J. Watts, B.Sc., ... 9 Fearing Street.
Secretary to the President.
Charles H. White, B.Sc., ... North Amherst, Mass.
Field Agent.
Newton Wallace, ... 6 Phillips Street.
Electrician.
Clarence A. Jewett, ... 112 Pleasant Street.
Superintendent of Buildings.
James Whiting, ... Hallock Street.
Foreman, Department of Floriculture.
William Chesley, ... Draper Hall.
Steward, Dining Hall.
Miss Mary E. Caldwell, ... Draper Hall.
Bookkeeper.
Miss Clara L. Stuart,[1] . . . . —— ——
Correspondence Clerk.
Miss Henrietta Webster, ... Draper Hall.
Clerk, Treasurer's Office.
Miss Gertrude E. Warner,[2] . . . . —— ——
Stenographer, Division of Agriculture.
Miss Ruth G. Smith, ... North Amherst, Mass.
Clerk to the Dean and Registrar.

---

[1] Absent after Feb. 1, 1911.

[2] Resigned December, 1910.

Miss **Helen Granger**, ... Draper Hall.
Stenographer, Division of Horticulture.
Miss **Dorothy Mudge**, ... North Amherst, Mass.
Clerk, Treasurer's Office.
Miss **Mabel R. Case**, ... Draper Hall.
Clerk, Division of Short Courses and Extension Work.
Miss **Stella H. Webb**, ... Draper Hall.
Correspondence Clerk, President's Office.
Miss **Lillian M. Gelinas**, ... Draper Hall.
Clerk, President's Office.
Miss **Alice Gilbert**, ... Draper Hall.
Stenographer, Division of Agriculture.

Additional Instructors for the Winter School, 1911.

F. E. Van Horn, Instructor in Butter Making.
J. W. Wellman, Instructor in the Use of Separators.

Officers of Short Course and Extension Work.

William D. Hurd, M.Agr., ... 82 Pleasant Street.
Director.
Charles H. White, B.Sc., ... North Amherst, Mass.
Field Agent.
Alvah J. Norman, B.Sc., ... Phillips Street.
Horticulture.
Charles J. Robinson, B.Sc., ... Lincoln Block.
Dairying and Animal Husbandry.
Miss **Mabel R. Case**, ... Draper Hall.
Clerk to the Director of Short Courses.

OFFICERS OF THE EXPERIMENT STATION.

William P. Brooks, Ph.D., ... 28 Northampton Road.
Director.

Joseph B. Lindsey, Ph.D., ... 47 Lincoln Avenue.
Vice-Director.

Fred C. Kenney, ... Mount Pleasant.
Treasurer.

Charles R. Green, B.Agr., ... Mount Pleasant.
Librarian.

DEPARTMENT OF PLANT AND ANIMAL CHEMISTRY.

Joseph B. Lindsey, Ph.D., ... 47 Lincoln Avenue.
Chemist.

Edward B. Holland, M.Sc., ... 28 North Prospect Street.
Associate Chemist, in charge of Research Division.

Fred W. Morse, Ph.D., ... 44 Pleasant Street.
Research Chemist.

Henri D. Haskins, B.Sc., ... 87 Pleasant Street.
In charge of Fertilizer Division.

Philip H. Smith, B.Sc., ... 102 Main Street.
In charge of Feed and Dairy Division.

Lewell S. Walker, B.Sc., ... 19 Phillips Street.
Assistant.

James C. Reed, B.Sc., ... Nutting Avenue.
Assistant.

Joseph F. Merrill, B.Sc., ... North Prospect Street.
Assistant.

Clement L. Perkins, B.Sc., ... 32 North Prospect Street.
Assistant.

Joseph P. Howard, ... North Amherst, Mass.
Collector.

Harry J. Allen, ... Amherst, Mass.
Assistant.

James R. Alcock, ... North Amherst, Mass.
Assistant in Animal Nutrition.

DEPARTMENT OF AGRICULTURE.

William P. Brooks, Ph.D., . . . Massachusetts Agricultural College.
Agriculturist.

H. J. Franklin, Ph.D., ... Wareham, Mass.
In charge of Cranberry Investigation.

Erwin S. Fulton, B.Sc., ... North Amherst, Mass.
First Assistant Agriculturist.
Edwin F. Gaskill, B.Sc., ... North Amherst, Mass.
Second Assistant Agriculturist.

Department of Horticulture.

Frank A. Waugh, M.Sc., . . . Massachusetts Agricultural College.
Horticulturist.
Fred C. Sears, M.Sc., ... Mount Pleasant.
Pomologist.
Jacob K. Shaw, M.Sc., ... 1 Allen Street.
Assistant Horticulturist.
David W. Anderson, B.Sc., ... 32 North Prospect Street.
Graduate Assistant.

Department of Botany and Vegetable Pathology.

George E. Stone, Ph.D., ... Mount Pleasant.
Botanist and Vegetable Pathologist.
George H. Chapman, M.Sc., ... 13 Fearing Street.
Assistant Botanist.
Sumner C. Brooks, B.Sc., ... 28 Northampton Road.
Assistant Botanist.

Department of Entomology.

Henry T. Fernald, Ph.D., ... 44 Amity Street.
Entomologist.
Burton N. Gates, Ph.D., ... 42 Lincoln Avenue.
Apiarist.
Arthur I. Bourne, B.A., ... 66 North Pleasant Street.
Assistant in Entomology.

Department of Veterinary Science.

James B. Paige, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Veterinarian.

Department of Meteorlogy.

John E. Ostrander, A.M., C.E., ... 35 North Prospect Street.
Meteorologist.
Charles M. Damon, ... Massachusetts Agricultural College.
Observer.

Other Officers of the Experiment Station.

Miss Rose J. Brown, ... Draper Hall.
Secretary to the Director.
Miss Jessie V. Crocker, ... Sunderland, Mass.
Stenographer, Department of Botany and Vegetable Pathology.

Miss Harriet Cobb, ... 35 North Pleasant Street.
Stenographer, Department of Plant and Animal Chemistry.
Miss Bridie O'Donnell, ... Hadley, Mass.
Stenographer, Department of Entomology.
Miss Alice M. Howard, ... North Amherst, Mass.
Stenographer, Department of Plant and Animal Chemistry.

COMMITTEES OF THE FACULTY.[1]

1910-11.

SCHOLARSHIP.

The DEAN.
Professor HASBROUCK.
Professor WHITE.
Assistant Professor GORDON.
Mr. MACKIMMIE.

SCHEDULE.

Professor OSTRANDER.
Associate Professor LOCKWOOD.
Associate Professor NEAL.

STUDENT ACTIVITIES.

Professor HURD.
Captain MARTIN.
Associate Professor LOCKWOOD.
Assistant Professor EYERLY.
Assistant Professor MCKAY.

LIBRARY.

Professor STONE.
Professor BROOKS.
Professor WELLINGTON.
Assistant Professor CANCE.

GRADUATE SCHOOL.

Professor FERNALD.
Professor WELLINGTON.
Professor PAIGE.
Professor STONE.
Professor SEARS.
Assistant Professor GORDON.

---

[1] The President of the college is ex officio member of these standing committees.

COMMITTEE ON EMPLOYMENT.

Professor SEARS.
Mr. KENNEY.
Assistant Professor HASKELL.

ENTRANCE EXAMINATIONS AND ADMISSION.

The REGISTRAR.
Assistant Professor HOWARD.
Assistant Professor OSMUN.
Assistant Professor MCKAY.
Mr. ASHLEY.

ATHLETICS.

Professor PAIGE.
Assistant Professor REYNOLDS.
Assistant Professor GORDON.

COURSE OF STUDY.

Professor HART.
Professor WAUGH.
Professor FOORD.
Professor OSTRANDER.
Associate Professor CHAMBERLAIN.

CATALOGUE AND OTHER PUBLICATIONS.

Associate Professor NEAL.
Assistant Professor EYERLY.
Assistant Professor CANCE.

UNCLASSIFIED STUDENTS.

Professor WHITE.
Associate Professor CHAMBERLAIN.
Associate Professor LOCKWOOD.

COMMENCEMENT.

Professor PAIGE.
Professor WELLINGTON.
Professor WHITE.
Captain MARTIN.
Mr. KENNEY.
Assistant Professor HOWARD.

ADVISORY COMMITTEE ON DISCIPLINE.

The DEAN.
The TREASURER.
The REGISTRAR.
The COMMANDANT.

THE COLLEGE.

ADMISSION.

A. APPLICATION FOR ADMISSION.

Correspondence about admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege on or before June 1 of the year in which examination is desired. Blanks for such application may be obtained by addressing the registrar of the college. If an applicant desires a free State scholarship, he must also present to the registrar a certificate of appointment from the State Senator of his district. Blanks for this purpose also may be obtained of the registrar. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. MODES OF ADMISSSION.

Students are admitted to the freshman class either upon *certificate* or upon *examination.* No *diploma* from a secondary school will be considered.

CERTIFICATES. — The entrance requirements may be met by certification in any of the following ways: —

1. By presenting certificate from a school approved for such privilege by this college.
2. By presenting certificate from any school approved by the college entrance examination boards.
3. By presenting the customary credentials from the Board of Regents of the State of New York for any of the subjects of the entrance requirements.

Certificates must present at least three of the six required subjects for admission, and not less than seven of the necessary fourteen credits in all. Those subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.[1]

Places of Examination. — Examinations for admission to the college are held as follows: —

In June of each year: in Amherst, in the building of the Department of Mathematics, Massachusetts Agricultural College; in Boston, in the College of Liberal Arts of Boston University, Boylston Street, corner of Exeter; in Worcester, in Horticultural Hall.

Schedule for Entrance Examinations, June 21–24, 1911. — The examinations in June will follow this schedule: —

First Day.

1 P.M. Registration.[2]
1.15–5 P.M. Latin (A and B).

Second Day.

8 A.M. Plane geometry.
10 A.M. Chemistry.
11.30 A.M. United States history and civics.
2 P.M. Algebra.
3.30 P.M. Physics.
4.30 P.M. Elective English.

---

[1] *Entrance with Condition in English.* — Under the rule permitting entrance conditions of not more than two units of the preparatory subjects, applicants may be admitted, upon examination, with a condition in English under these restrictions: (1) The parts of the preparatory study in English will be valued by the examiners approximately as follows in entrance units: (*a*) composition, etc., one and one-quarter units; (*b*) reading and study (including interpretation, three-quarters of a unit; see p. 28), one and three-quarters units; total, 3 units. (2) The applicant to show, upon examination, satisfactory preparation in work amounting to not less than two units.

The purpose of this provision is to avoid the possible injustice of excluding, without further trial, applicants who appear to be deficient in preparation in only one subject; and the examination will be so set as to permit the estimating of separate credits to carry out this purpose.

Attention is called to the standing rule of the uniform entrance requirement bodies concerning English as an admission subject; namely, that applicants whose work is seriously lacking in correct spelling, punctuation, grammar or other elementary essentials of good usage will be rejected.

Students so admitted, must, to remove the condition, pass an examination covering the regular 3-units requirement.

[2] Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.

Third Day.

8 A.M. Required English.
11 A.M. Solid geometry, agriculture.
2 P.M. History, required and elective.
5 P.M. Botany.

Fourth Day.

8 A.M. French, German, required and elective.
1 P.M. Greek, and all one-half credit electives, except those already noted.

Schedule for Entrance Examinations in September. — In September, 1911, the examinations will be given September 11 to 14, inclusive, and will follow the order indicated for June, beginning September 11 at 1 P.M.

C. REQUIREMENTS FOR ADMISSION.

The requirements for admission are based on the completion of a four-years course in a high school or its equivalent, and are stated in terms of units. The term unit means the equivalent of five recitations a week for a school year. Neither more nor less credit will be given in any subject than is indicated in the table below. Fourteen units must be offered for admission, of which nine are required and five are elective.

(*a*) The following nine units are required: —

Language.	
English,	3
French or German,	2
History and Civics.	
United States history and civics,	½
History (elective),	1
(*a*) Ancient history.	
(*b*) Medieval and modern history.	
(*c*) English history.	
(*d*) General history.	
Mathematics.	
Algebra, through progressions,	1½
Plane geometry,	1

(*b*) In addition to the requirements under (*a*), five units must be offered from the following-named elective subjects. Not more than four of those subjects in which the credit sought is one-half unit will be accepted.

Language.

English in addition to requirements,	1
French in addition to requirements,	2 or 1[1]
German in addition to requirements,	2 or 1[1]
Greek,	2 or 3
Latin,	2 or 3
Latin A, including Cæsar and Cicero, 2; Latin B, including Virgil and Prose Composition, 1.	

History.

In addition to requirements,	1 or 2

Mathematics, and Other Sciences.

Solid geometry,	½
Trigonometry,	½
Chemistry,	1
Physiography,	½
Physiology,	½
Agriculture,[2]	½ or 1
Botany,[2]	½ or 1
Geology,[2]	½
Physics,[2]	1
Zoölogy,[2]	½
Commercial geography,[3]	½
Drawing,[3]	½
Manual training,[3]	½ or 1

PRESENTATION OF NOTE-BOOKS. — The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 1). Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificate should not present note-books; but their certificate must state that note-books have been satisfactorily completed.

D. STATEMENT[4] OF PREPARATION REQUIRED FOR ADMISSION.

In some cases the requirements of the College Entrance Examination Board are here mentioned. A pamphlet containing detailed explanation of these requirements can be had of the Board for 10 cents. Address sub-station 84, New York City.

AGRICULTURE. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade.

---

[1] If but one elective unit be offered, it must be in the same language as that offered to meet the two-year language requirement.

[2] Note-book required as part of preparation will be credited as part of the examination.

[3] Certification necessary in these subjects; no examinations given.

[4] In alphabetical order by subjects.

Botany. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Stevens's "Introduction to Botany" and Bergen and Davis's "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit; and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

Chemistry. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements, some of the experiments being quantitative. The keeping of a note-book is required.

Commercial Geography. — Preparation should be given in a course equivalent to that laid down in Adams's "Commercial Geography," Trotter's "Geography of Commerce," or a similar work.

Drawing. — Applicants may offer either freehand or mechanical drawing, or both. They must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable them to draw correctly a simple geometric model from memory; or, if they present mechanical drawing, they must have considerable working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented see "Manual Training."

English. — Preparation in English should develop in the candidate (1) ability to express himself well and correctly in his mother tongue, and (2) ability to penetrate through language to the meaning that underlies it.

All candidates for admission — whether by examination or by certification — are urged to secure a thorough training in composition, in which at least part of the subjects written on shall be derived from personal observation, experience and thought. They are urged to cultivate especially, in all their writing, the habit of correctness in spelling, grammar, punctuation, sentence structure and paragraph building. This habit will be of much greater help to them in their work in the college than will mere knowledge of the prescribed books.

In the examination, direct questions may be put, including questions upon grammar. Several compositions, each about one hundred and fifty words long, will be required, including papers to test the candidate's ability to think and write clearly, either on matters involving personal experience or on topics involving knowledge of the books. All candidates received as members of the freshman class are expected to be able — as a result of their study of the books prescribed "For Study and Practice" — to paraphrase or interpret, with some insight, unfamiliar verse or prose of medium difficulty, in which the meaning does not depend on anything outside the passage itself; and, as part of every examination, at least one passage is given for such interpretation.

The list of books for 1911–12 is made up from the list recommended by the Conference on Uniform Entrance Requirements in English. The examination will be based upon these; but an applicant who has prepared upon other books of the longer list will be examined thereon if he notify the Department of English of his wish before the first day of June preceding the examinations.

For 1911: —

(*a*) For reading and composition practice: Shakspere's "Merchant of Venice" and "Julius Cæsar;" the "Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography;" Scott's "Ivanhoe;" Hawthorne's "House of the Seven Gables;" Dickens's "A Tale of Two Cities;" Scott's "The Lady of the Lake;" Macaulay's "Lays of Ancient Rome;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur."

(*b*) For detailed study and practice: Shakspere's "Macbeth;" Milton's "Lycidas," "Comus," "L'Allegro" and "Il Penseroso;" Burke's "Speech on Conciliation with America," or Washington's

"Farewell Address" and Webster's "First Bunker Hill Oration;" Macaulay's "Life of Johnson" or Carlyle's "Essay on Burns."

For 1912: —

(*a*) For reading and composition practice: Shakspere's "As You Like It" and "Julius Cæsar;" Franklin's "Autobiography;" Goldsmith's "The Deserted Village;" Dickens's "A Tale of Two Cities;" George Eliot's "Silas Marner;" Irving's "Sketch Book;" Scott's "The Lady of the Lake;" Byron's "Mazeppa" and "The Prisoner of Chillon;" and Macaulay's "Lays of Ancient Rome."

(*b*) For thorough study and practice: Shakspere's "Macbeth;" Milton's "Comus," "L'Allegro" and "Il Penseroso," or Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Burke's "Speech on Conciliation with America," or Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" Macaulay's "Life of Johnson," or Carlyle's "Essay on Burns."

For 1913, 1914, 1915: —

English Grammar and Composition. — Command of correct and clear English (spoken or written) requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, paragraphs, and the different kinds of whole composition, including letter writing, should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise narration, description and easy exposition and argument based upon simple outlines. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

Literature. — Ability to read with accuracy, intelligence and appreciation is sought through study of books included in two lists, headed respectively "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud, and encouraged to commit to memory some of the more notable passages, both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads, and with their place in literary history.

(*a*) Reading: The aim of this course is to foster in the student the habit of intelligent reading, and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from which at least ten units (each unit being set off by semicolons) are to be selected, two from each group: —

I. The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of books XI., XIII., XIV., XV., XVII., XXI.; Virgil's "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any unit of this group a unit from any other group may be substituted.

II. Shakspere's "Merchant of Venice;" "Midsummer Night's Dream;" "As You Like It;" "Twelfth Night;" "Henry the Fifth;" "Julius Cæsar."

III. Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" either Scott's "Ivanhoe" or "Quentin Durward;" Hawthorne's "House of the Seven Gables;" either Dickens's "David Copperfield" or "A Tale of Two Cities;" Thackeray's "Henry Esmond;" Mrs. Gaskell's "Cranford;" George Eliot's "Silas Marner;" Stevenson's "Treasure Island."

IV. Bunyan's "Pilgrim's Progress," Part I.; "The Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography" (condensed); Irving's "Sketch Book," Macaulay's "Essays on Lord Clive" and "Warren Hastings;" Thackeray's "English Humourists;" selections from Lincoln, including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address and the letter to Horace Greeley, along with a brief memoir or estimate; Parkman's "Oregon Trail;" either Thoreau's "Walden," or Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge;" "A Liberal Education" and "A Piece of Chalk;" Stevenson's "Inland Voyage" and "Travels with a Donkey."

V. Palgrave's "Golden Treasury" (first series), books II. and III., with especial attention to Dryden, Collins, Gray, Cowper and Burns; Gray's "Elegy in a Country Churchyard" and Goldsmith's "Deserted Village;" Coleridge's "Ancient Mariner" and Lowell's "Vision of Sir Launfal;" Scott's "Lady of the Lake;" Byron's "Childe Harold," Canto IV., and "Prisoner of Chillon;" Palgrave's "Golden Treasury" (first series), book IV., with especial attention to Wordsworth, Keats and Shelley; Poe's "Raven," Longfellow's "Courtship of Miles Standish," and Whittier's "Snow Bound;" Macaulay's "Lays of Ancient Rome" and Arnold's "Sohrab and Rustum;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Hervé Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City."

(*b*) Study: This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. For this close reading are provided a play, a group of poems, an oration and an essay, as follows: —

Shakspere's "Macbeth;" Milton's "L'Allegro," "Il Penseroso" and "Comus;" either Burke's "Speech on Conciliation with America," or both Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" either Macaulay's "Life of Johnson," or Carlyle's "Essay on Burns."

Examination.[1] — However accurate in subject-matter, no paper will be deemed satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which may be taken as a preliminary, and the other as a final.

The first part of the examination will be based upon ten units chosen, in accordance with the plan described earlier, from the lists headed reading; and it may include also questions upon grammar and the simpler principles of rhetoric, and short compositions upon topics drawn from the student's general knowledge or experience. On the books prescribed for reading, the form of the examination will usually be the writing of short paragraphs on several topics which the candidate may choose out of a considerable number. These topics will involve such knowledge and appreciation of plot, character-development and other qualities of style and treatment as may be fairly expected of boys and girls. In grammar and rhetoric, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors.

---

[1] Read in connection with this statement the first three paragraphs under "English," pp. 27, 28.

The second part of the examination will include composition and those books comprised in the list headed study. The test in composition will consist of one essay or more, developing a theme through several paragraphs; the subjects will be drawn from the books prescribed for study, from the candidate's other studies and from his personal knowledge and experiences quite apart from reading. For this purpose the examiner will provide several subjects, perhaps five or six, from which the candidate may make his own selections. The test on the books prescribed for study will consist of questions upon their content, form and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their other works, and the periods of literary history to which they belong.

ENGLISH, ELECTIVE. — To secure a fourth entrance credit in English, the applicant should do (*a*) the equivalent of three years' work, five periods weekly (required English), and also (*b*) the equivalent of a fourth year's work, five periods weekly. Applicants not certified with a fourth entrance credit will be examined. In order, however, that examination questions may be prepared, the applicant for examination should notify the Department of English by the first of June preceding the examinations, stating which English subject or subjects he wishes to present.

Subjects accepted. — The applicant may offer (*a*) any one of the subjects stated hereunder, or (*b*) any two of these subjects in combination.

(*a*) History of American literature.

(*b*) History of English literature (or lives of the great authors).

(*c*) Classics other than those read to meet the three-credit requirement, the applicant to present a complete list of his readings. The reading for the fourth credit should be of the same detailed, careful kind as is given the books prescribed for "Reading and Practice" in the official list of entrance requirement readings.

(*d*) Advanced composition.

(*e*) History of the English language.

(*f*) Advanced high school grammar.

Advanced Standing in College. — Whether advanced standing shall be given applicants entering with a fourth credit in English will be determined by consideration of each case individually. Much weight is given to the ability of the student to express himself correctly and clearly, to think clearly, and to grasp the meaning of printed language. A special examination will be given in the opening week of college, notice of which will be posted on the English bulletin board.

Presentation of Note-books and Themes. — Applicants for examination, either for fourth-unit credit or for advanced standing, are advised to present the note-books, themes, etc., prepared by them in the preparatory school, as an aid toward determining their proficiency.

FRENCH. — The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a single credit unit in French as an elective subject for entrance, when required units have been offered in French, the work described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.[1]

GEOLOGY. — Grouped with zoölogy, which see.

GERMAN. — The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).[1]

Third and fourth year German (elective subjects for admission). — For a single credit unit in German as an elective subject for entrance, when required units have been offered in German, the work described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

---

[1] If the two required and two elective modern language units are offered in French and German, the work known as "Elementary" may be offered in both cases.

GREEK. — Greek will receive credit as an elective requirement upon either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first two books of Xenophon's "Anabasis;" and (*b*) the translation of passages of Attic prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from the first book of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the forms and constructions of the passages.

HISTORY. — Of the one and one-half required units the one-half unit must be offered in United States history and civics, and the one required unit must be offered in either ancient history, medieval and modern history, English history or general history. Either one or two elective units in any one of the historical subjects here named may be offered, provided that such units may not be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on an outline map.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers, in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

LATIN. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," books I. to IV., or an

equivalent, and from Cicero's "Orations against Catiline;" and (*b*) the translation of passages of Latin prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from books I. and II. of Virgil's "Æneid;" and (*b*) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," books I. to IV.

MANUAL TRAINING. — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

MATHEMATICS. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents, the formulas for the *n*th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space: the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work should consist of both class-room work and laboratory practice. The work covered in the class room should be equal to that outlined in Hall & Bergen's "Text-book of Physics;" the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOLOGY. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body: Briefer Course."

ZOÖLOGY, PHYSIOGRAPHY, GEOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis's "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present a note-book, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

E. ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. OTHER INFORMATION ABOUT ENTRANCE.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)
2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.
3. Candidates must receive credit for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. No candidate deficient in both algebra and plane geometry will be admitted. For a special provision permitting entrance with a condition in English, see footnote, p. 24.
4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination, in the week following the Thanksgiving recess. (2) Second entrance condition examination, in the sixteenth week of the first semester.
5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.
6. Examinations in part of the subjects required for entrance may be taken one year before entering college.
7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses see "Short Courses."

9. All requests for information concerning admission of unclassified students should be addressed to Prof. E. A. White, chairman of committee on unclassified students.

G. Unclassified Students.

Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

1. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-years high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

2. No applicant under twenty-one years of age will be admitted as an unclassified student.

3. Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

4. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

5. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

6. All unclassified students are subject to the supervision of a special committee.

7. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

8. Unclassified students are subject to the regulations applying to classified students.

COURSES OF INSTRUCTION.

A. TABLE OF UNDERGRADUATE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

FRESHMAN YEAR.

First Semester.

[All work required.]

English,	4
French or German,[1]	4
Algebra,	5
Chemistry,	3
Hygiene,	1
Physical education,[2]	2
Public speaking (at option of instructor),	1
College life (attendance required without credit).	
	19 or 20

Second Semester.

[All work required.]

English,	4
French or German,	4
Geometry and trigonometry,	5
Chemistry,	3
Elementary agriculture,	2
Physical education,	2
Public speaking (if not taken in semester 1),	1
	20 or 21

SOPHOMORE YEAR.

First Semester.

[All work required.]

English,	2
French or German,	3
Agronomy,	3
Zoölogy,	3
Physics,	5
Physical education,	2
	18

---

[1] Students may continue in college the language that they present for admission, or they may take the other; but they must continue whichever language they so elect until the end of the first semester of the sophomore year. Eleven college credits are required in this language.

[2] Physical education includes military training.

Second Semester.

[All courses under "Required," with any two of those under "Elective."]

[Required.]

English,	2
Elementary horticulture,	2
Botany,	4
Agricultural industry,	3
Physical education,	2
	13

[Elective.]

French or German, Animal husbandry, Geology, Physics, Chemistry, Surveying,	each 3 hours. Any two,	6
		19 or 18

JUNIOR AND SENIOR YEARS.

In the junior and in the senior year, work must be taken each semester amounting to not fewer than seventeen nor more than twenty credits.

[Required.]

The following-named subjects are required after the sophomore year, as indicated: —

Physical education, two credits each semester of junior year,	4
Political science (Course 1, Economics),	3
English (any of the elective courses except Literature 15 and 16),	3

[Elective.]

Unless otherwise stated, elective courses are open to both juniors and seniors. Elections are subject to such provisions as either the faculty or the instructors in the courses may declare. In electing courses, students will prepare the statement of their elections strictly in this form:—

For semester one two of 1910–11, I elect these courses, namely: —

No. of Course in Catalogue.	Name of Course in Catalogue.

(Signed) ____________________

Class of 191__.

[Only those courses are here mentioned which are entirely elective; some courses that are open to election by part of the students but are required courses for others are omitted. For such courses, see under the respective department headings the descriptions of "Required Courses."]

- Agricultural education, 1, 2, 3, 4, 5, 6.
- Agriculture: —
  - Agriculture, 3.
  - Agronomy, 3, 4, 6, 8.
  - Animal husbandry, 2, 3, 4, 5, 6.
  - Dairying, 1, 2, 3, 4.
  - Farm administration, 3, 4.
- Botany, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14.
- Chemistry, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 17, 18, 19.
- Entomology, 2, 3, 4.
- Horticulture: —
  - Horticulture, 3, 4, 6.
  - Pomology, 1, 2, 3, 4.
  - Floriculture, 1, 2, 3, 4.
  - Landscape gardening, 1, 2, 3, 4, 5, 6, 7, 8.
  - Forestry, 1, 2.
  - Market gardening, 2, 3.
  - Drawing, 1, 2.
- Humanities: —
  - English: —
    - English language and journalism, 9, 10, 15, 16, 17.
    - Literature, 9, 10, 13, 14, 15, 16, 18.
    - Public speaking, 8, 9, 10.
  - Modern European languages: —
    - French, 6, 7, 8.
    - Spanish, 1, 2.
    - German, 6, 7, 8.
  - Music, 1, 2.
  - Political science, 2, 3, 4, 5, 6, 8.
- Mathematics, 7, 10; Physics, 6, 9, 15; Engineering, 8, 11, 12, 13, 14.
- Military science, 11, 12.
- Physical education, 7, 8, 9, 10.
- Rural social science: —
  - Agricultural economics, 4, 5, 6, 7, 9, 10.
  - Rural sociology, 12, 16.
- Veterinary science, 1, 3, 4.
- Zoölogy and geology: —
  - Zoölogy, 3, 4, 5, 6, 7, 8, 9.
  - Geology, 2.

B. UNDERGRADUATE COURSES.

[All courses given in the first semester bear odd numbers; all given in the second semester bear even numbers. Studies are pursued in courses, "course" implying the study given a subject within one semester, without regard to the total number of hours or to the number of credits. Under the heading "Required Courses" are classified all courses that are specifically required of any group of students, although in some cases the same courses are open to other students as electives. The special mention of certain courses as prerequisite to other courses does not imply that no courses but those so mentioned are "preliminary or preparatory" within the meaning of paragraph 9, page 9 of the Rules. Announcements of courses that are not given in 1910–11 are inclosed in brackets.]

Department of Agricultural Education.

Professor HART and Assistant Professor JENKS.

Elective Courses.

1. MEANING OF EDUCATION (PSYCHOLOGY). — A study of the development, structure and function of the nervous system with reference to the sense organs; relation of mind to the nervous system; growth and nature of mental processes; the activities of the mind in the process of learning. Text-book, lectures, discussion, and collateral readings and reports; 3 hours. Credit, 3.
Professor HART.

2. VOCATIONAL EDUCATION (HISTORY AND PHILOSOPHY). — A survey of educational, religious and social movements with reference to their vocational aspects; the growth of educational institutions as influenced by science and industry. Lectures, collateral readings, reports, and a thesis on some phase of industrial education; 3 hours. Credit, 3. Professor HART.

3. METHODS. — A study of mental growth; the theory and practice of teaching; school organization and methods of instruction; the place and function of agriculture in the course of study. Primarily for those who have had Course 1 or 2; 2 hours. Credit, 2. Professor HART.

4. TEACHERS' AGRICULTURE. — Designed primarily for those who intend to teach; may be taken in connection with Course 3. The work consists of the selection and review of such parts of the courses in agriculture, horticulture and the biological and physical sciences as are adapted to the work of the public schools; planning, and practical work in school gardens; decoration of school grounds;

equipment and conduct of playgrounds. One lecture period, 2 two-hour laboratory periods. Credit, 3.

Professor HART and Assistant Professor JENKS.

5. SEMINAR IN EDUCATION. — For students who have had courses 1, 2 and 3, or an equivalent. Topics that may be taken up for rather exhaustive study are: legislation and agricultural education, the place and value of agricultural science in school courses, etc. Seniors and graduate students; 2 hours. Credit, 2.

Professor HART.

6. SEMINAR IN EDUCATION. — As stated under Course 5.

Professor HART.

DIVISION OF AGRICULTURE.

Professor FOORD, Dr. BROOKS, Associate Professor LOCKWOOD, Associate Professor MCLEAN,[1] Assistant Professor HASKELL, Mr. GRIBBEN,[2] Mr. ROBINSON.

Sections.

AGRICULTURE.
AGRONOMY.
ANIMAL HUSBANDRY.
DAIRYING.
FARM ADMINISTRATION.

Agriculture.

Required Courses.

2. ELEMENTARY AGRICULTURE. — A brief course touching upon the application of science to the common things of the farm. The work of the agricultural experiment stations and its relation to farm practice will be considered. Lectures, text-book and laboratory. Freshmen; 1 laboratory and 1 lecture period. Credit, 2.

Elective Courses.

3. AGRICULTURAL SEMINAR. — A brief survey of current agricultural literature, open to juniors and seniors electing work in the Division of Agriculture. Topics will be assigned and reports required. One hour. Credit, 1. Professor FOORD.

---

[1] Beginning with second semester.

[2] Up to Jan. 20, 1911.

Agronomy.

Required Courses.

1. Soils and Fertilizers. — A study of the formation, classification and physical and chemical properties of soils. This is followed by study of methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments. Prerequisites, Chemistry 1 and 2. Sophomores; 3 lecture hours. Credit, 3.

Assistant Professor Haskell.

Elective Courses.

3. Field and Forage Crops. — History, classification, cultivation and harvesting, commercial grading and valuation. The crops studied are the cereal grains, grasses, legumes, forage crops, and those "money crops" of importance in New England. The laboratory work includes the testing of the purity and vitality of the seeds of the different field crops, valuation and judging thereof, and study of the varieties suited to New England conditions. Prerequisites, Agronomy 1 and Botany 2; 2 lectures and 1 laboratory period. Credit, 3. Assistant Professor Haskell.

4. Field Crop Improvement. — A study of the influences determining the yield and value of field crops, and of methods of selecting seed and plant with reference to crop improvement. Particular attention is given to the breeding of plants for early maturity, hardiness and disease resistance, so as to fit them to New England conditions. Lectures, laboratory and field work. Prerequisite, Agronomy 3; 1 lecture and 1 laboratory period. Credit 2.

Assistant Professor Haskell.

6. Advanced Soils. — Theoretical and practical work on irrigation and drainage; soil survey, with the view of observing the relation between types of soil and natural vegetation; soil mapping. Lectures, laboratory and library work; 1 lecture and 2 laboratory periods. Prerequisites, Agronomy 1 and Mathematics 8. Credit, 3. Assistant Professor Haskell.

8. Manures and Fertilizers. — An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers,

and leading up to the views at present accepted. Each of the important manures and fertilizers will be discussed, its origin and its chemical and physical characteristics being considered. Each material taken up will be studied in relation to its capacity to supply plant food and to its effects upon soil texture, moisture, temperature and flora. Considerable attention will be devoted to consideration of the experimental work which has been done, and which is now in progress, in manures and fertilizers. Prerequisite, Agronomy 1; 3 lectures a week, with occasional seminars. Credit, 3. Dr. Brooks.

Animal Husbandry.

Elective Courses.

2. Types and Breeds of Farm Animals. — A general introductory course. The development, characteristics and adaptability of the more common breeds of farm live stock. Lectures; Plumb's "Types and Breeds of Farm Animals." Sophomores; 2 lecture periods and 1 laboratory period. Credit, 3.
Associate Professor McLean.

3. Principles of Live Stock Improvement. — A careful study of the principles of inheritance, and a discussion of methods of improving herds or individual animals, of crossing and grading in the production of market and farm stock. Prerequisite, Course 2; 3 lecture periods; library references. Credit, 3.
Mr. Gribben, [Associate Professor McLean.]

4. Dairy Cattle. — Score cards as applied to breed type and their use in scoring for advanced registry; herd book study. One object is to acquaint the student with the various families of the different breeds, their producing powers and external characteristics. The men who will represent the college in judging contests will be chosen from those electing this course, according to the merit of their work. Text-book, lectures and laboratory work; textbook, Craig's "Live Stock Judging." Prerequisite, Course 2; 2 laboratory periods. Credit, 2. Associate Professor McLean.

5. Horses, Sheep and Swine. — A course similar to Course 4, but dealing with different classes of stock. Of necessity, the study cannot be so detailed as that made in the preceding course, yet a good working knowledge of the judging of these classes is aimed at.

The course will consist largely of judging practice, with some periods devoted to lectures, covering such topics as unsoundness in horses and the determination of age in domestic animals. Text-book, lectures and laboratory work. Craig's "Live Stock Judging." Prerequisite, Course 2; 2 laboratory periods. Credit, 2.

Mr. Gribben, [Associate Professor McLean.]

6. Feeding and Management of Farm Live Stock. — The principles of nutrition; their relation to stock feeding; the balanced ration; feeding standards; feed stuffs, method of manufacture, economy to the feeder; economical feeding and management of farm animals; feeding for special purposes (as of dairy cows for records and in preparation for public sales or exhibitions). Text-books and lectures; text-books, Henry's "Feeds and Feeding" and Jordan's "Feeding Farm Animals;" experiment station bulletins. Students electing this course are advised to present Chemistry 5 and 6 and register in veterinary science; 3 hours. Credit, 3.

Associate Professor McLean.

Dairying.

Elective Courses.

1. Milk and its Composition. — The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; methods in economic milk production; methods for testing herds and developing them to higher efficiency; the study of analysis of milk products by use of the Babcock test for fat, test for acidity and adulteration, and ordinary preservatives; moisture tests for butter; problems. Must be preceded or accompanied by Animal Husbandry 3; 2 lecture hours and 1 laboratory period. Credit, 3.

Associate Professor Lockwood.

2. Market Milk. — A study of the market milk conditions, extent and development of the business, supply and delivery; food value of milk and its use as food; milk and its relation to the public health; methods for the proper handling and preparing of milk and cream for direct consumption; certified milk, requirements and production; pasteurizing, sterilizing, standardizing and modifying; milk laws and inspection; a study of bacteriology relative to milk and dairy work. Must be preceded or accompanied by Animal Husbandry 4. Prerequisite, Course 1; 2 lecture hours and 1 laboratory period. Credit, 3. Associate Professor Lockwood.

3. Butter Making. — A study of hand and factory separators, separator construction and cream separation; handling milk and cream for butter making on the farm and in the factory; preparation of home-made and commercial starters, and ripening cream; churning; recording work; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy-building construction; plans for dairy buildings, arrangement, ventilation, light, sanitation; dairy machinery and care thereof; practical mechanics as applied to the creamery; cement construction as related to dairy construction work. Prerequisites, Courses 1 and 2; 2 lecture hours and 1 laboratory period. Credit, 3.
Associate Professor Lockwood.

4. Manufactured Milk Products. — Manufacture of other dairy products than butter. Cheddar and fancy cheeses; condensed milks; whey butter, cottage cheese, ice cream, casein, milk powder, etc.; dairying in other countries; library work. Must be preceded or accompanied by Animal Husbandry 6. Prerequisites, Courses 1, 2 and 3; 2 lecture hours and 1 laboratory period. Credit, 3.
Associate Professor Lockwood.

Farm Administration.

Elective Courses.

3. Farm Equipment. — A study of the material equipment of the farm aside from the land; farm buildings, their location, plan and arrangement; water supply; fencing problems; farm power; farm machinery; wagons. Prerequisite, Agronomy 1, Animal Husbandry 2 and Mathematics 5; 2 laboratory periods and 1 lecture hour. Credit, 3. Professor Foord.

4. Farm Management. — The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts. Prerequisites, Agronomy 1 and 3 and Animal Husbandry 2; 2 lecture or recitation hours and 1 seminar period. Credit, 3. Professor Foord.

Department of Botany.

Professor STONE, Assistant Professor OSMUN.

[The object of the courses in botany is to teach those topics pertaining to the science which have a bearing upon economic and scientific agriculture. Undergraduate work extending through five semesters is offered. Considerable latitude is allowed students in the senior year in their electives; and, besides the courses here outlined, students often take up the study of histology or of systematic botany, the microscopic examination of pure and adulterated human and cattle foods, spices and drugs, etc. Students sufficiently prepared are occasionally permitted to undertake special physiological and pathological investigations. A botanical conference is held monthly wherein new problems in botanical science are considered by graduate students and the seniors who elect botany.]

Required Courses.

2. HISTOLOGY, PHYSIOLOGY, MORPHOLOGY AND CLASSIFICATION OF PLANTS. — This course is divided into two parts: Part I. extends to the first week in May; Part II. occupies the remainder of the semester. Part I.: Devoted to study of the minute structure and the function of stems, leaves, roots and seeds, and of the chemical composition of plant constituents. The laboratory work consists largely of microscopic study of plant structures, with some time devoted to chemical tests for plant constituents. The lectures aim to amplify and interpret the laboratory work, and to explain the inter-relation of structure and function. Part II.: The laboratory periods are employed in the study of morphology and plant analysis. Lectures are given in morphology, ecology, evolution and taxonomy. Each student is required to collect and prepare an herbarium of 75 species of native plants. Gray's "New Manual of Botany" is used in determining and naming plants. Though only one lecture period is scheduled for this course, it is understood that laboratory hours may be used for lectures at the discretion of the instructor. Sophomores; 3 two-hour laboratory periods and 1 lecture hour. Credit, 4. Assistant Professor OSMUN.

Elective Courses.[1]

3. CRYPTOGAMIC BOTANY. — Systematic study of typical forms of the lower plants (bacteria, algæ, fungi, lichens, mosses and ferns); instruction in laboratory technique and methods, and the making of herbaria of lichens, mosses and ferns. Laboratory work and lectures; field excursions for the purpose of observing environmental habits and collecting material for laboratory study; collateral reading. This course is intended for those students who wish to specialize in biology; its purpose is to afford more thorough

---

[1] Students electing any of the junior work may take botany in their senior year, and those specializing in chemistry may take plant physiology in their senior year without having had the junior work in botany.

scientific training than is offered in Course 5, and students electing this course will attend the lectures in Course 5. Juniors; 3 two-hour laboratory periods and 1 lecture hour. Credit, 4.
Assistant Professor OSMUN.

4. CRYPTOGAMIC BOTANY. — This is a continuation of Course 3. Prerequisite, Course 3. Juniors; 1 two-hour laboratory period and 1 lecture hour. Credit, 2. Assistant Professor OSMUN.

5. PLANT PATHOLOGY. — This course comprises a study of the common diseases of crops and consideration of the methods for their prevention and control, and is intended especially for students in horticulture and agriculture. Laboratory work and lectures. The work in pathology is preceded by a brief study of the lower cryptogams. Juniors; 1 two-hour laboratory and 1 one-hour lecture period. Credit, 2.
Professor STONE and Assistant Professor OSMUN.

7. PLANT PATHOLOGY. — This course includes a study of the diseases of one or more crops and the methods of controlling them. Laboratory work and lectures, together with extensive reading of experiment station literature. The course is intended for those who wish to become more familiar with the diseases of one or more groups of economic plants. Seniors; those students continuing in botany must take Course 8; 3 three-hour laboratory periods and 1 lecture period. Credit, 5. Professor STONE.

8. PLANT PATHOLOGY. — As stated in Course 7. Prerequisite, Course 7. Professor STONE.

9. ECONOMIC FUNGI. — This course comprises the study of economic fungi from a taxonomic point of view, and is intended for those who wish a more comprehensive knowledge of the phylogenetic relationships of fungi. Laboratory work and lectures. Tubeuf & Smith's "Diseases of Plants" is used as a guide, with special monographs on fungi and with the more important experiment station literature treating of the life history of fungi. Seniors; must be followed by Course 10; 2 or 3 three-hour laboratory periods and 1 one-hour lecture period. Credit, 4 or 5.
Professor STONE.

10. ECONOMIC FUNGI. — As stated in Course 9. Prerequisite, Course 9. Professor STONE.

11. Plant Physiology. — This course is largely experimental, and is especially adapted to the needs of students who are taking chemistry. Laboratory work and lectures; various handbooks on plant physiology. Seniors; must be followed by Course 12; 3 three-hour laboratory periods and 1 one-hour lecture period. Credit, 5.
Professor Stone.

12. Plant Physiology. — As stated in Course 11. Prerequisite, Course 11. Professor Stone.

13. Physiology and Pathology of Shade Trees. — This course includes a comprehensive study of the diseases, structure and functions of trees and shrubs, and of every agency which in any way affects shade trees. Laboratory work and lectures; extensive reference reading. Designed for those students who intend to take charge of parks or large estates, or to become tree wardens, city foresters, landscape gardeners or professional advisers and caretakers. Seniors; must be followed by Course 14; 2 three-hour laboratory periods and 1 one-hour lecture period. Credit, 4.
Professor Stone.

14. Physiology and Pathology of Shade Trees. — As stated in Course 13. Prerequisite, Course 13. Professor Stone.

Department of General and Agricultural Chemistry.

Professor Wellington, Associate Professor Chamberlain, Assistant Professor Howard.

[The courses in chemistry aim to teach accurate observation, logical thinking and systematic and constant industry, together with a comprehensive knowledge of the subjects presented. Instruction is given through text-books, lectures and a large amount of laboratory work under supervision. The laboratory work at first consists of the study of the properties of elementary matter, the analysis of simple combinations, and their artificial preparation. This is followed by the quantitative analysis of salts, minerals, soils, fertilizers, and the chemistry of various manufacturing industries, especially those of agricultural interest, such as are concerned in the production of sugar, starch and dairy products; the preparation of animal and plant foods, their digestion, assimilation and economic use; and the official analysis of soils, insecticides, fungicides, waters, milk, wine, and other animal and vegetable products.]

Required Courses.

1. The Non-metals. — An introduction to chemical laws. The commoner non-metallic elements, their occurrence in nature, and their uses in the arts, are studied. Lectures and laboratory exercises. Freshmen; 4 hours. Credit, 3.
Assistant Professor Howard.

2. THE COMMON METALS. — This course extends the study of Course 1 to the metals common in the arts, and includes blowpipe analysis and elementary determinative mineralogy. Lectures, recitations and laboratory exercises. Prerequisite, Course 1. Freshmen; 4 hours. Credit, 3.

Assistant Professor HOWARD.

Elective Courses.

3. GENERAL CHEMISTRY. — This course makes a more thorough study of the physical laws and typical reactions than is made in Courses 1 and 2. For all students intending to specialize in chemistry this course is required. Prerequisite, Course 2. Lectures, 1 hour; laboratory, 4 hours. Credit 3.

Assistant Professor HOWARD.

4. QUALITATIVE ANALYSIS. — A course in the systematic analysis of the important metals and acids and their salts. Students electing advanced courses in chemistry should take this course. Lectures and laboratory work; Medicus's "Qualitative Analysis." Prerequisite, Course 2. Sophomores; 6 hours. Credit, 3.

Assistant Professor HOWARD.

5. ORGANIC CHEMISTRY. — This course, with Course 6, continues through the junior year. The two courses are designed especially: (1) for those who are looking forward to positions as chemists in agricultural colleges or experiment stations, the United States Department of Agriculture, or similar places, and who need a knowledge of chemistry for itself; and (2) for those who are expecting to enter like positions in other sciences, and who will use their knowledge of chemistry in a secondary way. It consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry; and forms a foundation for courses in physiological chemistry and agricultural analysis, and thus for possible future work in agricultural chemical investigation. Prerequisites, Courses 1, 2 and 4. Those electing Course 5 are expected to elect Course 6. Juniors; lectures, 3 hours; laboratory, 4 hours. Credit, 5.

Associate Professor CHAMBERLAIN.

6. — As stated under Course 5.

Associate Professor CHAMBERLAIN.

7. Agricultural Chemistry. — A course continuing through the two semesters of the junior year. This course and Course 8 are designed as an alternative for Courses 5 and 6. They are especially intended for those who, having completed Courses 1 and 2, do not care to continue the study of chemistry for itself, but who are planning to enter practical agricultural work and desire a somewhat further knowledge of chemistry as it is related directly to agriculture and agricultural problems. The work is planned in two parts, viz., *Course 7, Inorganic Agricultural Chemistry,* the study of the general composition, properties and reactions of soils and fertilizers, and in addition to this the study of some of the common materials of construction, such as tile, brick, cements, paints, oils, etc.; and *Course 8, Organic Agricultural Chemistry,* the study of plants and animals as to composition, nutritive value and general processes of nutrition and growth, and also the study of products manufactured from them, such as milk, butter, sugar, maple syrup, denatured alcohol, wood pulp, paper, etc. The treatment of the subject in both of these courses is entirely general, avoiding all complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the chemical aspect of agricultural processes and products. Prerequisites, Courses 1 and 2. Juniors; those electing Course 7 are expected to elect Course 8; lectures, 3 hours. Credit, 3.

Associate Professor Chamberlain.

8. — As stated under Course 7.

Associate Professor Chamberlain.

9. Quantitative Analysis. — A course continuing through the two semesters of the junior year; for those who wish to acquire skill in chemical analysis. Students intending to enter experiment station or chemical-control work have here an opportunity to become familiar with the reactions and processes concerned. Prerequisite, Course 4. Juniors; those electing Course 9 are expected to elect Course 10; lectures, 1 hour; laboratory, 9 hours. Credit, 5.

Professor Wellington.

10. — As stated under Course 9.

Professor Wellington.

13. Physiological Chemistry, Vegetable. — This course and Course 14 are intended to be supplementary to Courses 5 and 6 and Courses 7 and 8. To those who expect to take up scientific

work, and who have had Courses 5 and 6, Course 13 will give acquaintance with the chemistry of the physiological processes in plants, and the action of physiological substances. Together with Course 14, it gives additional training in the chemical problems of agricultural experiment station work, and it will, with the courses in analytical chemistry, fit men for such work. To those who will not take up scientific lines of work, but will follow practical agriculture, it will give additional knowledge of the facts and processes with which they will meet. It will consider more exactly and in greater detail the chemical and physiological aspect of problems which were treated generally in Courses 7 and 8. Prerequisites, Courses 5 and 6, or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor CHAMBERLAIN.

14. PHYSIOLOGICAL CHEMISTRY, ANIMAL. — A continuation, or counterpart, of Course 13, but dealing with animals. Prerequisites, Courses 5 and 6, or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3. Associate Professor CHAMBERLAIN.

15. CHEMICAL PROBLEMS. — A course in the historical progress of agricultural chemistry. The inception and growth of modern knowledge in agricultural chemistry will be intimately studied for the purpose of familiarizing the student with the experimental work and the logical processes of the more notable achievements in this department of chemistry. The course includes work in the biography and literature of research, as well as general chemical history. The classic works of Liebig, Wöhler, Liebermann, Baeyer, Gilbert, Henneberg, Tollens, Fischer and others will be taken up. In the light of the studies made, present-day problems in agricultural chemistry will be examined and methods for their solution tried. Prerequisites, Courses 5 and 6, 9 and 10, 11, 13, 14. Open to students only by permission; lectures, reading and laboratory work; 1 lecture and 4 laboratory periods. Credit, 5.

Professor WELLINGTON.

17. CHEMICAL PRACTICE IN AGRICULTURE. — This course and Course 18 are divided into subcourses as follows: —

A. Analysis of Fertilizers, Insecticides and Fungicides. — The theory, with a large amount of practice in this subject, is given under the close supervision of a teacher. The methods followed are in the first place comparative. Then the preferred official methods are intimately studied, especially with reference to their limitations. The students are impressed with the fact that, even at this late day, all of these methods require revision, and are only awaiting the clear head of the learned man and the expert technician for their improvement. Prerequisite, Course 4. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5.

B. Analysis of Foods and Fodders. — This course is pursued in a method uniform with that of Course 17*A*. Both courses are intended to fit men for experimental station and control work, as well as for research efficiency. The latest results of alimentation, physiology and the composition of foods and condiments are studied. The students will be urged to make inquiry for themselves in the fields of study. Prerequisites, Courses 5 and 6, 9 and 10, 13; corequisite, Course 14; lecture 1 hour, laboratory 9 hours. Credit, 5.

C. Chemistry of Sugar Making and Refining. — In this course, after the chemical character of sugar and its function as a food have been determined, the theory and practice of the subjects named will be intimately studied. This involves practice in the analysis of many common chemicals, minerals and manufactured products, such as limestone, coal, boneblack, sulphites, clays, etc. The behavior of sugars and allied substances toward light, qualitatively and quantitatively, is investigated. The students are fitted for service in sugar houses and sugar refineries. Prerequisite, Courses 5 and 6; lectures 1 hour, laboratory 9 hours. Credit, 5.

D. Dairy Chemistry. — This course takes up instruction in the various processes of dairy chemistry, including chiefly the analysis of foods for dairy animals and the dairy products. Given in alternate years; given in 1910–11. Open only on permission; lectures 1 hour, laboratory 6 hours. Credit, 3. Professor WELLINGTON.

18. CHEMICAL PRACTICE IN AGRICULTURE. — As stated under Course 17. Professor WELLINGTON.

19. SANITARY CHEMISTRY. — This course is planned to bring into striking and intimate relationships many hitherto missing facts between the science of the lecture room and laboratory and the actual practice of living as it is pursued in every condition in which a person finds himself between birth and death. It is hoped that this course will impart to every one who takes it new conceptions of the functions and duties of practical life. It is believed that,

through carefully and minutely demonstrated experiments, this end will be attained. Given in alternate years; not given in 1910–11. Open only on permission; lectures 2 hours. Credit, 2.

Professor WELLINGTON.

Department of Entomology.

Professor FERNALD, Mr. SUMMERS.

[A knowledge of insects is of importance in every department of life, and particularly in connection with agriculture, horticulture, biology, landscape gardening and forestry; it therefore forms part of a general education. An introductory course in this subject is accordingly offered in the junior year. For those who desire a further knowledge of the subject, because of its importance to their future occupation, a senior course is also offered, so arranged as to be of especial value for those who expect to take up agriculture, horticulture, landscape gardening, forestry or science teaching.]

Elective Courses.

2. GENERAL AND ECONOMIC ENTOMOLOGY. — This course comprises studies in the structure of insects as applied to their identification, and in the principles of classification; a systematic examination of the different groups and of the most important economic insects of each group, including their life histories and habits, recognition of their work as shown in the collection and in the field, and methods for their control. The most important insecticides, and their preparation and application with different kinds of apparatus are also treated. Field work in collecting insects is a part of the course; and this is accompanied by laboratory work on methods of pinning, pressing and mounting insects, and of classifying them. Juniors; 4 one-hour lecture periods till about May 1; thereafter 1 one-hour lecture period and 3 two-hour laboratory or field periods. Credit, 4. Professor FERNALD.

3. ADVANCED ENTOMOLOGY. — This course is subdivided according to the particular needs of those taking it, and is to a large degree given in the form of individual instruction.

A. Morphology. — Careful studies of the structure of insects belonging to each of the larger and more important orders, together with lectures on the subject, followed by the identification of insects of each of these groups and the study of the collections, to teach the use of the analytical tables and of structural characters in the determination of insects.

B. Histology. — Lectures on the internal anatomy and histology of the various organs, with particular reference to those affected by the various insecticides.

C. Insecticides and Apparatus. — Lectures on the chemistry, preparation and application of the different insecticides, their merits and defects, tests for detecting adulterations; and a study of other methods of insect control, together with laboratory work on adulterated materials.

D. Coccidology. — Laboratory work on methods of preserving, mounting and identifying scale insects, particular attention being given to those of greatest economic importance.

E. Bibliography. — Studies of the various entomological publications and of the methods of finding the literature on any insect.

F. Special Studies. — In these studies the insects most closely related to the future occupation of the student will receive attention. The results of these studies are brought together in the form of an essay or thesis; this will include all the essentials of what is known of the structure, life history, habits and injuries caused by each insect studied, together with methods of treatment, and a list of the best articles found in the course of the work. Comstock's "Manual for the Study of Insects" is used in the laboratory work. Seniors; prerequisite, Entomology 2; students electing 3 must also take 4; 1 one-hour lecture period and 3 two-hour laboratory or field periods. Credit, 4.

Professor FERNALD and Mr. SUMMERS.

4. ADVANCED ENTOMOLOGY. — As stated in Course 3. Prerequisite, Course 3. Professor FERNALD and Mr. SUMMERS.

DIVISION OF HORTICULTURE.

Professor WAUGH, Professor SEARS, Professor WHITE, Associate Professor MOON, Mr. HELLER, Mr. NOYES, Mr. NORMAN, Mr. RANE.

Departments.

HORTICULTURE.
POMOLOGY.
FLORICULTURE.
LANDSCAPE GARDENING.
FORESTRY.
MARKET GARDENING (SECTION).
DRAWING (SECTION).

Department of Horticulture.

[The general subject of horticulture divides naturally into the subjects of pomology, floriculture, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore here grouped under the general designation of horticulture.]

Required Courses.

2. NURSERY PRACTICE. — This course treats of the fundamental operations of horticulture — propagation, pruning, cultivation — as related to the physiology of the plant. Lectures and practicums; Bailey's "Nursery Book" as text in propagation. Sophomores; 2 hours. Credit, 2. Mr. NORMAN.

Elective Courses.

3. PLANT MATERIALS. — This course aims to make the students familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them. Prerequisite, Horticulture 2; 2 lecture periods and 1 laboratory period. Credit, 3. Professor WHITE.

4. PLANT MATERIALS. — A continuation of Course 3, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions. Prerequisite, Horticulture 3; 2 lecture periods and 1 free afternoon. Credit, 3. Professor WHITE.

6. PLANT BREEDING. — This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops. Seniors and graduates; open only to students well prepared in agricultural or horticultural subjects; 2 lecture periods and 1 two-hour laboratory period. [Not given in 1910–11.] Credit, 3.

Department of Pomology.

Elective Courses.

1. Practical Pomology. — *General.* — A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of stock, pruning, spraying, etc. Text and reference books; field and laboratory exercises. Prerequisite, Horticulture 2. Juniors; 5 hours. Credit, 3. Professor Sears.

2. Practical Pomology. — *Special.* — The special application of the general principles discussed in Course 1 to the culture of the principal kinds of fruits, such as apples, pears, peaches, plums, cherries and quinces; grape culture and the culture of small fruits, such as blackberries, raspberries, currants, gooseberries and strawberries. Text-books, lectures and reference books; field and laboratory exercises. Prerequisites, Horticulture 2 and Pomology 1. Juniors; 5 hours. Credit, 3. Professor Sears.

3. Systematic Pomology. — A study of the varieties of the different fruits and of nomenclature, with critical descriptions; special reference being given to relationships and classification. Text-books, laboratory and field exercises. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 5 hours. Credit, 3. Professor Sears.

4. Commercial Pomology. — The storing and marketing of fruits; includes a discussion of storage houses, the handling and storing of fruits, fruit packages, methods of grading and packing, etc. Text and reference books; laboratory exercises. Seniors; prerequisites, Horticulture 2, Pomology 1, 2 and 3; 5 hours. Credit, 3. Professor Sears.

Department of Floriculture.

Elective Courses.

1. Greenhouse Management. — This course is designed to familiarize students with methods followed in the management of greenhouse crops. The students are instructed in the practical operation of glazing concrete, bench construction, bulb culture, greenhouse watering, fumigating and ventilating, in the care of furnaces, and in the methods of propagation of greenhouse plants

by seeds, cuttings, budding and grafting. This is designed as a laboratory course, and students electing it will be expected to arrange their hours according to the needs of the work. Prerequisite, Horticulture 2. Juniors; 7 hours a week. Credit, 4.
Professor WHITE.

2. GREENHOUSE DESIGN AND CONSTRUCTION. — A continuation of Course 1, including also a study of the location, arrangement and construction of greenhouses; the drawing of plans for commercial and private ranges, to show foundations and details in construction of superstructure; arrangement of heating pipes; estimates of comparative cost of different methods of construction; drafting specifications. Juniors; prerequisite. Floriculture 1; 7 hours. Credit, 4. Professor WHITE.

3. FALL GREENHOUSE CROPS. — A study of important fall and winter crops and their care, — chrysanthemums, carnations, violets, roses, palms, and the like; the importation, purchase and growth of bulbous material; the preparation of material for forcing; design making; house and church decorating. Lectures, text-books and laboratory exercises. Prerequisites, Floriculture 1 and 2. Seniors; 5 hours. Credit, 3. Professor WHITE.

4. SPRING GREENHOUSE CROPS. — The culture of individual crops in their relation to spring work in a florist establishment. A critical study of methods of propagating bedding plants, the nature and use of these plants, practice in planting them and in the spring care of herbacious perennials and wholesale and retail marketing of spring plants. Lectures, text-books and practical exercises. Seniors; prerequisites, Floriculture 1, 2 and 3; 5 hours. Credit, 3.
Professor WHITE.

Department of Landscape Gardening.

Elective Courses.

1. ELEMENTS OF LANDSCAPE GARDENING. — Reconnoissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected works of leading landscape gardeners; grade design, road design and field work. Students should have preparation in surveying, mathematics, plant materials and drawing. Must be followed by Course 2. Juniors; 7 hours a week. Credit, 4. Mr. NOYES.

2. Elements of Landscape Gardening. — As stated under Course 1. Prerequisite, Course 1.
Professor Waugh and Mr. Noyes.

3. General Landscape Gardening. — Field notes; examination of completed works and those under construction; design of architectural details; planting plans; estimates; written reports of individual problems. Seniors; prerequisites, Landscape Gardening 1 and 2, and either plant materials (Horticulture 3 and 4) or advanced mathematics; must be followed by Course 4; 7 hours. Credit, 4. Professor Waugh and Mr. Noyes.

4. General Landscape Gardening. — As stated under Course 3. Prerequisite, Course 3.
Professor Waugh and Mr. Noyes.

5. Theory of Landscape Art. — The general theory and applications of landscape study, including a brief history of the art. Seniors and graduates; 2 hours. Credit, 2.
Professor Waugh.

6. Architecture. — A course giving the history of architectural development, the different historic types, with special reference to the underlying principles of design and construction and to the applications in landscape architecture. Lectures, illustrated with stereopticon and plates; conferences; practice in design; 2 hours. Credit, 2. Mr. Noyes.

7. Civic Art. — The principles and applications of modern civic art, including city design, city improvement, village improvement and rural improvement. Text-book, Robinson's "Modern Civic Art." Prerequisites, Courses 1, 2 and 3; must be followed by Course 8; 6 hours. Credit, 3. Professor Waugh.

8. Civic Art. — As stated under Course 7. Prerequisite, Course 7. Professor Waugh.

Department of Forestry.

Elective Courses.

1. DENDROLOGY AND SILVICULTURE. — These two subjects run parallel throughout the year. Under dendrology, the habits and needs of trees are studied, their distribution, soil and moisture requirements, growth, etc. Under silviculture are taken up the life history of trees and stands; tree characteristics, how modified; the concept of a forest and its subdivisions; methods of reproduction, both natural and artificial, with both theoretical and practical work in thinnings and nursery practice. Juniors; 3 lectures weekly, with 4 additional hours of optional field work. Credit, 3.
Associate Professor MOON.

2. DENDROLOGY AND SILVICULTURE. — As stated under Course 1. Prerequisite, Forestry 1. Associate Professor MOON.

Market Gardening.

Elective Courses.

2. ELEMENTS OF MARKET GARDENING. — A study of market gardening as a business, with detailed consideration of the conditions under which it is practiced. The problems of soil selection and soil management, garden fertilization and tillage, receive attention from the viewpoint of the market gardener, and considerable time is devoted to the study of garden crops. Juniors; prerequisite, Horticulture 2; 3 hours. Credit, 3. Mr. HELLER.

3. ADVANCED MARKET GARDENING. — A continuation of the work begun in Market Gardening 2, taking up problems of seed growing, selection of varieties, crop management, harvesting, storage and marketing. A study is made of the greenhouse vegetable industry, and considerable time devoted to growing the special forced crops. Some time is given to a systematic study of vegetable description, classification and nomenclature. Collateral reading is required. Floriculture 2 must be taken in connection with this course. Seniors; prerequisite, Market Gardening 2; 5 hours. Credit, 3.
Mr. HELLER.

Drawing.

Elective Courses.

1. FREEHAND DRAWING. — Lettering; sketching from type models, leaves, fruits, vegetables, flowers and trees, insects and small animals; laying flat and graded washes in water colors; water-color

rendering of fruits, vegetables, leaves, flowers and trees; topographical lettering and conventional signs in ink; conventional coloring; mapping in ink and in water colors. (Was not given in 1909–10.) Juniors; 6 hours. Credit, 3. Mr. NOYES.

2. MECHANICAL DRAWING. — Inking exercises; geometric problems; projection; intersections, isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Juniors; 6 hours. Credit, 3. Mr. NOYES.

DIVISION OF THE HUMANITIES.

Professor MILLS,[1] Associate Professor NEAL, Assistant Professor EYERLY, Assistant Professor McKAY, Mr. HOLCOMB, Mr. MACKIMMIE, Mr. ASHLEY, Mr. GREEN, Miss GOESSMANN.

Departments.

ENGLISH.
MODERN EUROPEAN LANGUAGES.
MUSIC (SECTION).
POLITICAL SCIENCE.
LIBRARY.

Department of English.

ENGLISH LANGUAGE; JOURNALISM.
LITERATURE.
PUBLIC SPEAKING.

ENGLISH LANGUAGE.

Required Courses.

1. FRESHMAN ENGLISH.—Composition; introduction to literature. Recitations and lectures; theme writing; conferences.[2] Freshmen; 4 hours. Credit, 4.

Associate Professor NEAL and Assistant Professor McKAY.

2. FRESHMAN ENGLISH. — As stated under Course 1. Prerequisite, Course 1; 4 hours. Credit, 4.

Associate Professor NEAL and Assistant Professor McKAY.

---

[1] Absent on leave.

[2] Student assistants (in charge of freshman groups for tutoring in spelling, punctuation and similar elementary matters; theme readers). Class of 1911: Herbert Jonathan Baker (second year); Edgar Morton Brown (second year, semester one); Leonard Matthews Johnson (second year); Bernard Ostrolenk (second year). Class of 1912: Royal Norton Hallowell (semester one), Marshall Cotting Pratt, Lawrence Peck Rockwood, Lewis Raymond Sellew (second semester).

3. SOPHOMORE ENGLISH.[1] — Composition; literature. Prerequisite, Course 2; sophomores; 2 hours. Credit, 2.
Associate Professor NEAL.

4. SOPHOMORE ENGLISH.[1] — As stated under Course 3. Prerequisite, Course 3.
Assistant Professor McKAY and Miss GOESSMANN.

7. TRAINING COURSE. — A course (*a*) required of student assistants in English, and (*b*) open (with the instructor's consent) to candidates for a tutorship. Candidates are expected to take it in qualifying for appointment. The course may be taken for either sophomore or elective credit. Two hours. Credit, 2.
Associate Professor NEAL.

8. TRAINING COURSE. — As outlined under Course 7.
Associate Professor NEAL.

A. Use of Library. — Lectures on the use of the Library. Hours to be appointed. Required of all sophomores in the first semester as part of Course 3. Mr. GREEN.

[Enrolment in the elective courses in the Department of English is subject to the approval of the instructor. The membership in several of the courses is strictly limited; hence students are advised to plan their work well in advance in order to be sure of completing the required three hours of post-sophomore English. This credit must be made up without taking Literature 15 or 16.]

ENGLISH LANGUAGE AND JOURNALISM.

Elective Courses.

9. JOURNALISM.[2] — Under the title "Journalism" are grouped agricultural journalism, newspaper and periodical writing and a somewhat more advanced study of journals and journalistic writing. All these courses are closely related. In the beginning, the course in agricultural journalism and that in periodical writing are identical; the introductory work in periodical writing — such

---

[1] Students whose work in Courses 1 and 2 reaches a standard satisfactory to the Department may be excused from not more than half of the sophomore work in English. At present, students in Course 3 or Course 4 are permitted, under restrictions to be stated by the Department, to substitute Public Speaking for English Language and Literature.

[2] The attention of students who elect courses in Journalism is specially directed to the courses given in the collateral subjects here mentioned: Agricultural Education, especially Courses 1 (Psychology) and 2; French; German; Spanish; Political Science; Rural Social Science; English Language and Literature; Public Speaking. By judicious election among the scientific courses and among courses in the subjects named above, a student wishing to follow either agricultural or general journalism can broadly and effectively prepare himself for the profession.

as desk editing, proof reading, and especially the writing of news stories in simple reporting style — being deemed necessary as training preparatory to any kind of journalistic work. The chief differences between the courses are, (1) that Course 9*A* (agricultural) opens more immediate opportunities for practical work, as publication for a limited amount of the student writing is found in agricultural periodicals; and (2) that Course 9*B* (periodical) opens the way for more varied observation and investigation, and for more varied experience in writing, contributing in these ways to general culture, as Course 9*A* contributes to specialized training. In addition, the course in periodical writing has in mind the increasing importance of rural journalism as an influence and occupation in the developed rural community.

A. Agricultural Journalism. — The production of "copy" adapted to the use of agricultural periodicals. The class, organized as an editorial staff, is charged with the preparation of an agricultural periodical. Two hours. Credit, 2.

B. Newspaper and Periodical Writing. — The elements of journalism — newspaper and magazine writing, reporting, editing, printing, etc. The class, organized as an editorial staff, is to issue a periodical. It is responsible for "covering" events, desk editing, copy and proof reading, making "dummies" and writing legends for illustrations, completing "forms" and "publishing" the periodical upon schedule time, etc. The first semester will be devoted principally to newspaper writing; the second semester to periodical writing. Two hours. Credit, 2.

[*C. Proseminar in Journalism.* — Informal, beginning with a study by individual students of editorial writing and of types of magazine writing, such as "descriptive" articles, research articles, "human interest" articles, and articles in "popularized" science. Members of the class are expected to formulate through these studies theories of journalism and journalistic writing, to state them in thesis form, and to produce articles of the kinds studied. Reference reading and reports upon current periodicals may be called for. Given only by special arrangement. One hour. Credit, 1.]

9*A* and 9*B* may be taken at the same time.

Associate Professor NEAL.

10. JOURNALISM. — As stated under Course 9.

Associate Professor NEAL.

15. ENGLISH LANGUAGE. — See Literature 15.

16. ENGLISH LANGUAGE. — See Literature 16.

[17. ADVANCED COMPOSITION. — A course varying in plan, but usually concerned with some form of exposition, description or narration. Not given in 1910–11. Two hours. Credit, 2.
Associate Professor NEAL.]

LITERATURE.

Required Courses.

1, 2, 3, 4, 7 and 8. — See the courses so numbered under "English Language."

Elective Courses.

9. CULTURAL READING.[1] — Individual reading courses intended to encourage broader acquaintance with (*a*) literature, (*b*) art, (*c*) philosophy (including psychology), or (*d*) history (including political and social science). The reading must be sufficient to require forty-five hours; must be entirely non-technical; may be in any of the subjects indicated above; must not consist in research; and may — subject strictly to its purpose — be taken in any department by arrangement between the student and the instructor in the department concerned. If the reading be taken outside the Department of English, the student must present in writing the consent of the instructor under whom he wishes to read. Each student must present a two-thousand-word paper and a notebook. Prerequisite, the sophomore courses in English; total credits allowed to one student for cultural reading work, 2. Credit, 1.
Associate Professor NEAL.

10. CULTURAL READING. — As stated under Course 9.
Associate Professor NEAL.

13. LITERARY HISTORY. — A course dealing with literary periods or with authors; in 1910–11, Elizabethan literature. Lectures, text-book and reference assignments, and class-room interpretation of authors; much outside reading; written studies upon

---

[1] Courses in semester one include: Poe, Kipling, Stevenson, English fiction in the nineteenth Century, Carlyle, American prose, Wordsworth, Tennyson, psychology, evolution; and, outside the Department of English, biography of great chemists, political science, and landscape art.

announcement. Given upon application. Prerequisite, the sophomore courses in English. Two hours. Credit, 2.
Associate Professor NEAL.

14. LITERARY HISTORY. — As outlined under Course 13. In 1910–11, Tennyson. Associate Professor NEAL.

[15. ENGLISH LANGUAGE AND LITERATURE. — The origin, history and development of the English language; essayists and novelists of the nineteenth century. Continuous with Course 16. Not given in 1910–11. Seniors; 3 hours. Credit, 3.
Professor MILLS.]

[16. ENGLISH LANGUAGE AND LITERATURE. — Continuous with Course 15. The elements of literary criticism; nineteenth century poets. Not given in 1910–11. Seniors; 3 hours. Credit, 3.
Professor MILLS.]

18. ADVANCED LITERATURE. — This course varies from year to year. It will usually provide opportunity either for intensive study of great writers or for study of the historical development or the structure and characteristic of literary types; in 1910–11, the English novel. Open only upon arrangement. Tests and examinations. Two hours, with a third hour at the option of the instructor. Credit, 2. Associate Professor NEAL.

PUBLIC SPEAKING.

Required Courses.

1. FRESHMAN PUBLIC SPEAKING. — Freshman public speaking is required in either the first or the second semester, at the option of the instructor. Voice exercises; practice in the delivery of declamations and interpretive readings. Freshmen; 1 hour. Credit, 1. Assistant Professor McKAY.

2. FRESHMAN PUBLIC SPEAKING. — As stated under Course 1. Required of all freshmen who are not assigned to take Course 1.
Assistant Professor McKAY.

3. SOPHOMORE PUBLIC SPEAKING. — Original speeches on assigned topics and declamations, supplemented by exercises in voice development and gesture. Elective within the English Depart-

ment, as stated under English Language 3. Prerequisite, Course 1 or 2, or its equivalent. Sophomores; 1 hour. Credit, 1.

Assistant Professor McKay.

4. Sophomore Public Speaking. — Work of the same character as in Course 3, but more advanced. This course offers practice in the making of longer original speeches, in declamation, debating and dramatic reading. Elective within the English Department, as stated under English Language 3. Prerequisite, Course 3. Sophomores; 1 hour. Credit, 1.

Assistant Professor McKay.

Elective Courses.

8. Oratory. — Speeches on assigned topics; prescribed reading; the preparation and delivery of an oration, supplemented by a study of the principles of oratorical composition and delivery. It is especially recommended for those who desire to enter the Flint contest. Prerequisite, Course 3; 1 hour. Credit, 1.

Assistant Professor McKay.

9. Debating. — Considerable time is given to the study of argumentation and brief-drawing. The class is divided into teams for the platform discussion of leading questions of the day. This course is designed to develop readiness in extempore speaking. It is recommended for those who desire to enter the intercollegiate debates. Prerequisite, Course 3; 2 hours. Credit, 2.

Assistant Professor McKay.

10. Dramatic Reading. — Exercises for voice and gesture; a study of the elements of vocal expression and action; expressional reading of selections in prose and poetry; presentation of scenes from plays. Prerequisite, Course 3; 1 hour. Credit, 1.

Assistant Professor McKay.

Department of Modern European Languages.

FRENCH.

Required Courses.

1. Elementary French. — A beginning course. Fraser & Squair's "French Grammar;" reader; graduated texts. Required of freshmen presenting German for entrance who do not continue that language and have not studied French; open upon arrangement to other students. Freshmen; 4 hours. Credit, 4.

Mr. Mackimmie.

2. Elementary French. — As stated under Course 1. Prerequisite, Course 1. Mr. Mackimmie.

3. Intermediate French (third year). — Training for rapid reading; the reading of a number of standard novels and plays; composition; reports on collateral reading from periodicals and scientific texts in the library. Required of freshmen who present two years of French for entrance and do not take German, and of sophomores who take Courses 1 and 2 as freshmen; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. Mackimmie.

4. Intermediate French. — As stated under Course 3, but not required of sophomores who take Courses 1 and 2 as freshmen. Prerequisite, Course 3. Mr. Mackimmie.

5. Advanced French (fourth year). — A reading course; representative masterpieces of the nineteenth century; collateral reading and written reports. Required of sophomores who take Courses 3 and 4 as freshmen; open upon arrangement to other students. Prerequisite, Course 4; 3 hours. Credit, 3.
Mr. Mackimmie.

Elective Courses.

6. Advanced French (fourth year). — A general view of the history of French literature. Several plays of the great classical dramatists will be read. Prerequisite, Course 5. Sophomores; open upon arrangement to other students; 3 hours. Credit, 3.
Mr. Mackimmie.

7. French Language or Literature (fourth year). — Courses in more advanced subjects; to be announced; 3 hours. Credit, 3.
Mr. Mackimmie.

8. French Language or Literature. — As outlined under Course 7. Mr. Mackimmie.

SPANISH.

Elective Courses.

1. Elementary Spanish. — Grammar, with special drill in pronunciation; reading from a simple reader. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. Mackimmie.

2. MODERN SPANISH AUTHORS. — Reading from modern Spanish novel and drama. Prerequisite, Course 1. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. MACKIMMIE.

GERMAN.

Required Courses.

1. ELEMENTARY GERMAN. — Grammar and composition; the reading of short stories, poems, plays, etc. Especial attention is given to oral questioning and answering in German, and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Mr. ASHLEY.

2. ELEMENTARY GERMAN. — As stated under Course 1. Prerequisite, Course 1. Mr. ASHLEY.

3. INTERMEDIATE GERMAN. — Rapid reading of selected works from Schiller, Goethe, Lessing and others; review of grammar and dictation in German; outside readings. Required of freshmen who present German for entrance and do not take French. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. ASHLEY.

3A. INTERMEDIATE GERMAN. — Rapid reading of prose works, such as Sudermann's "Frau Sorge," and dramas, such as "Wilhelm Tell" and "Die Journalisten." Required of sophomores who took Courses 1 and 2 as freshmen. Mr. ASHLEY.

4. INTERMEDIATE GERMAN. — As stated under Course 3. Prerequisite, Course 3. Mr. ASHLEY.

4A. INTERMEDIATE GERMAN. — As stated under Course 3A. Open to students who have completed German 3A; 3 hours. Credit, 3. Mr. ASHLEY.

5. ADVANCED GERMAN. — Literary study of the classicists, — Schiller's "Wallenstein," Lessing's "Nathan der Weise," Goethe's "Iphigenia," etc.; collateral readings in German and class-room reports. Conducted in German. Prerequisite, Course 4. Sophomores; required of those who took German 3 and 4 as freshmen; open upon arrangement to other students; 3 hours. Credit, 3.
Mr. ASHLEY.

Elective Courses.

6. Advanced German. — As stated under Course 5. Sophomores; open upon arrangement to other students. Prerequisite, Course 5; 3 hours. Credit, 3. Mr. Ashley.

7. Modern German. — Reading of articles from the best modern German periodicals, such as "Ueber Land und Meer;" conversation and composition work based on text. "Ferien in Deutschland," prepared by instructor; 3 hours. Credit, 3. Mr. Ashley.

8. Modern German. — As stated under Course 7. Mr. Ashley.

Music.

Elective Courses.

1. History and Interpretation of Music. — History of music among the ancients; medieval religious and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school — Bach, Händel, Haydn, Gluck and Mozart. One hour. Credit, 1. Mr. Ashley.

2. History and Interpretation of Music. — A continuation of Course 1. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera. The Modern school and Modern composers. One hour. Credit, 1. Mr. Ashley.

Department of Political Science.

Required Courses.

1. Economics. — An introductory course. A study of the nature and scope of economics; the evolution and organization of the present economic system; and the principles of consumption, production, exchange and distribution. Text-books, lectures and essays; required, but may be taken in either the junior or the senior year; 3 hours. Credit, 3. Assistant Professor Eyerly.

Elective Courses.

2. Government. — The organization and working of the various kinds of government in the United States; government problems connected with transportation, taxation and monopolies;

comparison of State leadership in American agriculture with that in European agriculture. Text-books, lectures and assigned reading; 3 hours. Credit, 3. Assistant Professor EYERLY.

3. SOCIOLOGY. — The nature, scope and principles of sociology; social origins and structures; control by custom, religion, education, public opinion, law, etc.; social ideals; practical problems in social progress. Lectures, text-book and assigned readings; 3 hours. Credit, 3. Assistant Professor EYERLY.

4. ECONOMIC HISTORY. — The economic history of England to the reign of Henry VIII.; the history of England and the American colonies in conjunction to 1783; and thereafter the history of England and of the United States. Emphasis is laid on economic history, but the more important political and religious movements are treated in their economic relations. Text-books, lectures and assigned reading; 3 hours. Credit, 3.

Assistant Professor EYERLY.

5. THE HISTORY OF NEW ENGLAND. — In this course, New England is regarded as a unit. Although the history of agriculture and rural life is treated with special fulness, ample attention is given to political, religious and ethical history. It is hoped that the student will not only be led to an intelligent understanding of present economic conditions, but will also be imbued with a progressive loyalty to the highest ideals of the New England of the past. Lectures and required reading; 3 hours. Credit, 3.

Mr. HOLCOMB.

6. PRACTICAL PROBLEMS IN ECONOMICS. — An advanced course following Economics 1. A group of problems will be selected for careful study. Each student will make a special study of one of the following topics: labor, capital, money, banking, insurance, protection and free trade, railways, corporations, and the personal distribution of wealth. Lectures, assigned readings and reports; 3 hours. Credit, 3. Assistant Professor EYERLY.

8. THE HISTORY OF IDEALS. — This course treats history from the idealistic, rather than from the economic, point of view. It attempts to define the great ideals which have impelled some of the most important social, political, esthetic, scientific, ethical and religious movements of medieval and modern history, and to trace the

causes of the success or failure of the movements to which these ideals have led. Christianity, including monasticism, modern Catholicism and Protestantism; medieval art and architecture; the modern scientific movement; and social and political democracy will be treated historically from this point of view. Lectures and reading; 3 hours. Credit, 3. Mr. HOLCOMB.

Department of Mathematics, Physics and Civil Engineering.

Professor OSTRANDER, Associate Professor HASBROUCK, Captain MARTIN, Mr. DUNCAN.

Required Courses.

1. HIGHER ALGEBRA. — A brief review of radicals, quadratic equations, ratio and proportion, and progressions; binomial theorem, undetermined coefficients, summation of series, continued fractions, logarithms, theory of equations. Wells's "College Algebra." Freshmen; 5 hours a week. Credit, 5.
Associate Professor HASBROUCK, Captain MARTIN and Mr. DUNCAN.

2. SOLID GEOMETRY. — Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Gore's "Solid Geometry." Freshmen; required unless accepted for admission; 2 hours. Credit, 2. Mr. DUNCAN.

4. PLANE TRIGONOMETRY. — The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry." Required unless accepted for admission. Freshmen; 3 hours. Credit, 3.
Associate Professor HASBROUCK, Captain MARTIN.

5. GENERAL PHYSICS. — Elementary mechanics and heat. Lectures, recitations and laboratory work. Text-book and lectures. Sophomores; 4 hours class-room work and 1 laboratory period. Credit, 5. Adjunct Professor HASBROUCK and Mr. DUNCAN.

Elective Courses.

6. GENERAL PHYSICS. — Electricity and light. Text-book, lectures, recitations and laboratory work. Sophomores; 2 hours of class-room work and 1 laboratory period. Credit, 3.

Adjunct Professor HASBROUCK and Mr. DUNCAN.

[9. ADVANCED PHYSICS. — The senior elective in physics is not offered for the year 1910–11.

Adjunct Professor HASBROUCK.]

8. PLANE SURVEYING. — The elements of the subject, including the adjustment and use of the usual instruments. Text-book and lectures. Sophomores; 6 hours a week. Credit, 3.

Mr. DUNCAN.

7. ANALYTIC GEOMETRY. — A discussion of the geometry of the line, the circle, of conic sections and of the higher plane curves. Fine and Thompson's "Coördinate Geometry." Prerequisites, Mathematics 1, 2 and 4; 3 hours a week. Credit, 3.

Professor OSTRANDER.

10. DIFFERENTIAL AND INTEGRAL CALCULUS. — A first course in the subject, with some of the more important applications. Granville and Smith's "Differential and Integral Calculus." Prerequisites, Mathematics 1, 2, 4 and 7; 5 hours. Credit, 5.

Professor OSTRANDER.

[11. HYDRAULICS AND SANITARY ENGINEERING.[1] — Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Text-book and lectures; 3 hours. Not given in 1910–11. Credit, 3.

Professor OSTRANDER.]

[12. ADVANCED SURVEYING.[1] — Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Text-book and lectures; 6 hours. Not given in 1910–11. Credit, 5. Professor OSTRANDER.]

13. STRESSES IN STRUCTURES.[1] — An elementary course in roof

---

[1] Instruction in civil engineering will be given in two distinct courses of one year each, the courses alternating. The courses are open to students of the junior and senior classes.

and bridge stresses. Text-book and lectures; 4 hours. Not given in 1911–12. Credit, 3. Professor **Ostrander.**

14. Strength of Materials, Foundations and Masonry Construction.[1] — Text-book and lectures; 6 hours. Not given in 1911–12. Credit, 5. Professor **Ostrander.**

15. Analytic Mechanics. — A course in theoretical mechanics, based on the calculus, with applications to problems. Text-book and lectures. Prerequisites, Mathematics 7, 10; 3 hours. Credit, 3. Professor **Ostrander.**

Department of Military Science and Tactics.

Captain **Martin.**

[The Department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-years course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the practical (drill) courses in Military Science are given up to the Christmas recess and from the close of the spring recess to the end of the semester each year; the corresponding courses in Physical Education occupy the intervening time.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

A dark blue uniform, old army pattern, costing about $15, is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $15 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited, unless the consent of the military instructor be obtained.]

Required Courses.

1. Introduction to Military Science and Tactics. — Practical instruction in infantry drill regulations through the school of the battalion in close and extended order; advance and rear guards;

outposts; marches; ceremonies; guard duty. Upon the conduct and proficiency of this year depends the appointment of corporals for the ensuing year. Freshmen; first semester until Christmas recess; 3 hours. Credit, 1. Captain MARTIN.

2. INTRODUCTION TO MILITARY SCIENCE AND TACTICS. — As stated under Course 1. Freshmen; second semester after spring recess; 3 hours. Credit, 1. Captain MARTIN.

3. PRACTICE OF MILITARY SCIENCE AND TACTICS. — Practical instruction as before; pointing, aiming and sighting drills; litter drills, and first aid to the injured by detachment; target practice, in gallery and on the range. Corporals are appointed from this class. On their conduct and proficiency depends the appointment of sergeants in the next class. Sophomores; first semester until Christmas recess; 3 hours. Credit, 1. Captain MARTIN.

4. PRACTICE OF MILITARY SCIENCE AND TACTICS. — As stated under Course 3. Sophomores; second semester after spring recess; 3 hours. Credit, 1. Captain MARTIN.

5. THEORY OF MILITARY SCIENCE AND TACTICS. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the company, "Manual of Guard Duty," "Small Arms Firing Regulations." Sophomores; 1 hour. Credit, 1.
Captain MARTIN.

6. THEORY OF MILITARY SCIENCE AND TACTICS. — As stated under Course 5. Sophomores; 1 hour. Credit, 1.
Captain MARTIN.

7. PRACTICE OF HIGHER MILITARY SCIENCE AND TACTICS. — Practical instruction as before, target practice, in gallery and on the range. Sergeants are appointed from this class. On their conduct and proficiency depends their selection as officers for the ensuing year. When necessary, officers will also be appointed from this class. Juniors; first semester until Christmas recess; 3 hours. Credit, 1. Captain MARTIN.

8. PRACTICE OF HIGHER MILITARY SCIENCE AND TACTICS. — As stated under Course 7. Juniors; second semester after spring recess; 3 hours. Credit, 1. Captain MARTIN.

9. THEORY OF HIGHER MILITARY SCIENCE AND TACTICS. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the battalion; advance and rear guards; outposts; marches and ceremonies; "Manual of Field Service Regulations;" preparation of reports, returns, muster-rolls, enlistment and discharge papers, rosters, requisitions, etc.; army regulations; lectures on military science. Juniors; 1 hour. Credit, 1. Captain MARTIN.

10. THEORY OF HIGHER MILITARY SCIENCE AND TACTICS. — As stated under Course 9. Juniors; 1 hour. Credit, 1. Captain MARTIN.

Elective Courses.

11. ADVANCED MILITARY SCIENCE AND TACTICS. — Practical instruction as before; conduct of drills of lower classes. Officers will as a rule be selected from this class. Cadets electing Courses 11 and 12 must make the election for the year, and not later than the first Monday in June of their junior year. No cadet electing this course will after the commencement drill be permitted to change his election without the consent of the dean of the faculty and of the commandant. Seniors; first semester until Christmas recess; 3 hours. Credit, 1. Captain MARTIN.

12. ADVANCED MILITARY SCIENCE AND TACTICS. — As stated under Course 11. Seniors; second semester after spring recess; 3 hours. Credit, 1. Captain MARTIN.

Department of Physical Education and Hygiene.

Assistant Professor REYNOLDS.

HYGIENE.

Required Courses.

1. HYGIENE. — Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation. Freshmen; 1 hour. Credit, 1. Assistant Professor REYNOLDS.

PHYSICAL EDUCATION.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in Military Science. All classified undergraduate students are given a physical examination upon entering.]

Required Courses.

1. ELEMENTARY GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 2. Freshmen; 3 hours. Credit, 1. Assistant Professor REYNOLDS.

2. ELEMENTARY GYMNASTICS. — As stated under Course 1.
Assistant Professor REYNOLDS.

3. GRADED GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 4. Sophomores; 3 hours. Credit, 1. Assistant Professor REYNOLDS.

4. GRADED GYMNASTICS. — As stated under Course 3.
Assistant Professor REYNOLDS.

5. HEAVY GYMNASTICS. — Drills, games and athletics; from January 1 to April 1, in connection with Course 6. Juniors; 3 hours. Credit, 1. Assistant Professor REYNOLDS.

6. HEAVY GYMNASTICS. — As stated under Course 5.
Assistant Professor REYNOLDS.

Elective Courses.

7. TRAINING COURSE. — Leadership class and squad work; supervision of indoor and outdoor athletic contests and games; boxing and wrestling. Seniors; 3 hours. Credit, 1.
Assistant Professor REYNOLDS.

8. TRAINING COURSE. — As stated under Course 7.
Assistant Professor REYNOLDS.

9. ADVANCED GYMNASTICS. — For those who wish to become candidates for the gymnastic team. Credit, 0.
Assistant Professor REYNOLDS.

10. ADVANCED GYMNASTICS. — As stated under Course 9.
Assistant Professor REYNOLDS.

Department of Rural Social Science.

President BUTTERFIELD, Assistant Professor EYERLY, Assistant Professor CANCE.

AGRICULTURAL ECONOMICS.

Required Courses.

2. AGRICULTURAL INDUSTRY AND RESOURCES. — A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers'

demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions. Sophomores; 3 hours. Credit, 3. Assistant Professor CANCE.

Elective Courses.

4. ELEMENTS OF AGRICULTURAL ECONOMICS. — This course is designed to follow the required work in the elements of economics. It will consider the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; the agricultural market; determination of price; speculation; problems of land tenure and land values; business co-operation; farmers' organizations; the farmer and legislation; the maintenance of the social, political and economic status of the farmer; and the relation of the farmer to the State. Lectures, text, readings, topics and field work; 3 hours. Credit, 3.

Assistant Professor CANCE.

5. HISTORICAL AND COMPARATIVE AGRICULTURE. — A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on present conditions and the history of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, to show that the agriculture of any country is a distinct individual problem, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Seniors; open to other students upon arrangement; prerequisite, Course 4 or equivalent; 3 hours. Credit, 3. Assistant Professor CANCE.

6. CO-OPERATION IN AGRICULTURE. — The course contemplates a somewhat comprehensive view of the history, principles and social relations of agricultural organization for profit. Part I., The business aspects of co-operation: (1) A survey of the development and progress, the methods and economic results, of the farmers' organizations and great co-operative movements in the past; (2) the phases of business organization of agriculture abroad, and the

present aspects and tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers, and practical working plans for co-operative associations, as illustrated by the most advanced and prosperous business organizations and exchanges, with particular reference to the marketing of perishable products. Part II., Social aspects of co-operation: The second part of this course treats of the social conditions necessary to successful co-operation; the effect of co-operation on character, *e.g.,* on individualism, conservatism; the relation of co-operation to political achievement, especially as illustrated in European countries; the influence of co-operation in begetting a community consciousness; and the effect of organization on class status. Lectures, assigned reading and practical exercises; 3 hours. Credit, 3.

Assistant Professor Cance (Part I.)
Assistant Professor Eyerly (Part II.).

7. Specific Problems in Agricultural Economics. — An advanced course for students desirous of studying more intensively some of the problems immediately affecting the welfare of the farmer and society. Some of the problems that may be studied are: land problems; land tenure; size of farms; causes affecting land values; private property in land; taxation and inheritance; special problems; marketing and manufacturing farm products; cost of production; farm labor in New England; immigration; shifting of the rural population. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest. Seniors; open upon arrangement to other students; enrollment subject to approval of instructor; 2 hours a week. Credit, 2.

Assistant Professor Cance.

9. Seminar. — Research in agriculture: New England agriculture to 1860. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged. Credit, 1.

Assistant Professor Cance.

10. Seminar. — As stated in Course 9.

Assistant Professor Cance.

RURAL SOCIOLOGY.

Elective Courses.

12. THE RURAL COMMUNITY. — There are two general divisions of the subject. There is, first, a study of the social status of the rural population, including the significance of the movement to the cities, the present social conditions of farm people, the social effects of rural life, and the social aspect of various agricultural questions of a technical or economic character. In the second part of the study will be discussed the various social agencies in rural progress, such as means of communication, farmers' organizations, rural schools, means of agricultural education, rural religious institutions and the federation of rural social agencies. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3.
President BUTTERFIELD and Assistant Professor EYERLY.

16. RURAL LITERATURE. — A critical and appreciative study of writers, both in prose and poetry, who have interpreted Nature from the viewpoint of the lover of country life, and those who have idealized agriculture, horticulture and other rural pursuits, together with those who have upheld as an ideal the development of a rural environment in cities; 3 hours. Credit, 3.
Mr. HOLCOMB.

Department of Veterinary Science.

Professor PAIGE.

[The courses in veterinary science have been arranged to meet the needs of students who purpose following practical agriculture, and of prospective students of human and comparative medicine.]

Elective Courses.

1. INTRODUCTORY BACTERIOLOGY. — The object of this course is to acquaint the student with the various organisms found in air, water, soil, milk and the body, and with the relation of these organisms to such processes as decomposition, fermentation and digestion, and to the production of disease. Toxic substances resulting from the growth of organisms, and the antitoxins used to counteract their action, are considered. Lectures, recitations and laboratory work. Seniors; 3 two-hour laboratory exercises. Credit, 3. Professor PAIGE.

3. VETERINARY SCIENCE. — A course treating of veterinary hygiene, comparative anatomy and general pathology; veterinary materia medica and therapeutics; the theory and practice of

veterinary medicine; general, special and operative surgery; and veterinary bacteriology and parasitology. Lectures, clinics, demonstrations and laboratory exercises. Must be followed by Course 4. Seniors; 5 hours. Credit, 5. Professor PAIGE.

4. VETERINARY SCIENCE. — As stated under Course 3.
Professor PAIGE.

Department of Zoölogy and Geology.

Assistant Professor GORDON.

ZOÖLOGY.

Required Courses.

1. ELEMENTARY ZOÖLOGY. — This course in a general way constitutes the zoölogical part of an introductory course in biology. Laboratory dissection and lectures; laboratory text, Drew's "Invertebrate Zoölogy." Sophomores; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

Elective Courses.

3. INVERTEBRATE ZOÖLOGY. — This course does not include the insects. Economic zoölogy. Text-books, Parker & Haswell's "Textbook of Zoölogy," Vol. I., and Drew's "Invertebrate Zoölogy." Prerequisite, Course 1 or its equivalent. Must be followed by Course 4. Juniors; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

4. VERTEBRATE ZOÖLOGY. — Text-book, Parker & Haswell's "Textbook of Zoölogy," Vol. II. Prerequisite, Course 3. Juniors; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3.
Assistant Professor GORDON.

5. ANIMAL PARASITES. — A survey of this special field of zoölogy. Laboratory and lecture work, with outside reading. Laboratory technique. Seniors; not open to fewer than 3 students. Prerequisites, Courses 1, 3 and 4. Three two-hour periods, 2 one-hour periods. Credit, 5. Assistant Professor GORDON.

6. ANIMAL PARASITES. — A continuation of Course 5. Two two-hour periods, 1 one-hour period. Credit, 3.

7, 8 and 9. ADVANCED ZOÖLOGY. — See "Graduate School."
Assistant Professor GORDON.

GEOLOGY.

Elective Courses.

2. GENERAL GEOLOGY. — Rock-forming minerals; rock types; dynamical, structural and surface geology. Lectures, map and field work. Sophomores; 1 two-hour laboratory period and 2 lecture periods. Credit, 3. Assistant Professor GORDON.

THE GRADUATE SCHOOL.

THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., LL.D., President of the College.

HENRY T. FERNALD, Ph.D., Acting Director of the Graduate School and Professor of Entomology.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years. Demands for these courses have now greatly increased, and in recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station agriculturists, bacteriologists, botanists, chemists, entomologists, horticulturists and zoölogists; and for numerous other positions requiring a great degree of skill and scientific knowledge.

ADMISSION.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the professor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for admission to the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, — together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

NATURE AND METHODS OF GRADUATE WORK.

Persons taking graduate work will find this quite different in its nature from undergraduate courses. A broad knowledge of two (or three) subjects is required, and the professors in charge of these may adopt any methods which may seem desirable to secure this to the student. Lectures, laboratory and field work in various forms are utilized; but whatever the method chosen, the aim is to train the students in methods of original investigation and experiment, inductive reasoning and the ability to carry on independent research. In addition to the lectures, a large amount of outside reading is required, the object being to give a broad knowledge of all aspects of the subjects chosen, in addition to the complete knowledge of those portions involved in or directly related to the original investigation which is to result in the thesis. Originality and ability to lead in scientific research after completing graduate work, and the establishment of a broad and thorough foundation upon which these qualities must be based, are the objects aimed at; and any methods which promise to give these results may be made use of (varying according to the nature and personal equation of each student), the supervision being largely individual rather than collective.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as the major and the other as the minor. These subjects may not be selected in the same department.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major, the others as minors. No two of these subjects may be taken in the same department.

Advanced students who are not candidates for degrees may, with the approval of the faculty of the school, take more than one subject in the same department.

A statement of the subjects chosen must in each case be submitted to the director of the school for approval by the necessary committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

A description of the equipment of the various departments is given under "General Information."

THESES.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject, must show that its writer possesses the ability to carry on original research, and must be an actual contribution to knowledge.

The thesis in its final form, ready for the printer, must be submitted to the director of the school for examination by the committee on the graduate school before the candidate for the degree may take the required oral examination. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in the thesis.

All theses become the property of the department in which they are prepared. When they are printed, five copies of each thesis must be deposited with the department.

FINAL EXAMINATIONS.

For the degree of master of science, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degree of doctor of philosophy, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

DEGREES CONFERRED.

The degree of master of science is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.

2. The devotion of twenty hours each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The degree of doctor of philosophy is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

2. The devotion of twenty hours each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science is $10, and for the degree of doctor of philosophy, $25.

Courses for Degree of Master of Science.

Available either as major or minor subjects for the degree of master of science: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Mathematics and physics.
Veterinary science.

Courses for the Degree of Doctor of Philosophy.

Available for a major subject for the degree of doctor of philosophy: —

Botany.
Chemistry.
Entomology.
Horticulture.

Available for a minor subject for the degree of doctor of philosophy: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Zoölogy.

GENERAL OUTLINE OF COURSES FOR THE DOCTORATE.

(*a*) *Major Courses.*

BOTANY. — The following subjects in botany may be studied: —

(*a*) Vegetable physiology.
(*b*) Vegetable pathology.
(*c*) Mycology.
(*d*) Ecology.
(*e*) Taxonomy.
(*f*) Phylogeny.
(*g*) History of botany.
(*h*) History and theory of evolution.

These subjects are pursued, to a greater or less extent, as the previous training of the student and the nature of the original problem undertaken may determine. The object of the course is to give the student a technical training in botany, to develop the spirit of research and to lay a broad foundation in the subject. (As a supplement to this course the student will do well to take, in addition to his prescribed minor work, a brief course in the history of philosophy and psychology.) Extensive reading of botanical literature, both general and specific, is required in certain subjects, and occasional lectures are given. A botanical conference is held monthly, in which various new problems of botanical science are considered by graduate students and the seniors who elect botany. A thesis dealing with some economic problem in plant physiology or pathology, or in both, and containing a distinct contribution to knowledge, is required.

CHEMISTRY. — The following subjects in chemistry may be studied: —

(*a*) Inorganic analysis, qualitative (of the rarer elements) and quantitative.
(*b*) Crystallography.
(*c*) Physical chemistry.
(*d*) Descriptive and determinative mineralogy.
(*e*) Chemical geology.
(*f*) Soil formation.
(*g*) Soil physics and chemistry; gas analysis; synthetic inorganic work.
(*h*) Chemical theory and history.
(*i*) General organic chemistry.
(*j*) Special topics in organic chemistry.

(*k*) Elementary quantitative organic analysis.

(*l*) Proximate qualitative and quantitative organic analysis, including determination of organic radicles.

(*m*) Organic synthesis of aliphatic and aromatic compounds.

(*n*) Problems in chemical manufacture.

(*o*) Recent chemistry of plant nutrition.

(*p*) Animal physiological and pathological chemistry, including the chemistry of foods, of milk and milk industries, of urine, urinalysis, and the standards for feeding of all kinds.

(*q*) Toxicology.

(*r*) Insecticides and fungicides.

Frequent examinations on current chemical literature are given. Early in the course original work on some chemical subject pertaining to agriculture must be begun. The history and results of this work must, before the awarding of the degree, be submitted in the form of a thesis containing a distinct contribution to knowledge.

ENTOMOLOGY. — I. For the degree of doctor of philosophy as a major: Some knowledge of all the divisions of this subject is essential for the professional entomologist, though a large part of his time will be devoted only to certain portions. To insure some familiarity with all these divisions, lectures, laboratory work, field training or required reading are given in each of the following topics: —

(*a*) *Morphology.* — Embryology; life history and transformations; histology; phylogeny and the relation of insects to other arthropods; hermaphroditism; hybrids; parthenogenesis; pedogenesis, heterogamy; chemistry of colors of insects; luminosity; deformities of insects; variation; duration of life.

(*b*) *Ecology.* — Dimorphism; polymorphism; warning coloration; mimicry; insect architecture; fertilization of plants by insects; instincts of insects; insect products of value to man; geographical distribution in the different faunal regions; methods of distribution; insect migration; geological history of insects; insects as disseminators of disease; enemies of insects, vegetable and animal, including parasites.

(*c*) *Economic Entomology.* — General principles; insecticides; apparatus; special cases; photographs of insects and their work; methods of drawing for illustrations; field work on insects and study of life histories; legislation concerning insects.

(*d*) *Systematic Entomology.* — History of entomology, including classifications and the principles of classification; laws governing nomenclature; literature, how to find and use it; indexing literature; number of insects in collections and in existence (estimated); lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections of insects.

(*e*) *Seminar.* — A monthly meeting of graduates, at which reports on current literature are presented and various entomological topics of importance are discussed.

(*f*) *Required Readings.* — The best articles on the various topics named above and on the different orders of insects, to cover from fifteen thousand to twenty thousand pages of English, French and German, the candidate to be examined at the close of his course on this with his other work.

(*g*) *Thesis.* — A thesis, illustrated with drawings, consisting of the results of original investigation upon one or several topics, and constituting a distinct contribution to knowledge, must be completed before the final examinations are taken.

II. For the degree of doctor of philosophy as a minor, and for the degree of master of science either as a major or minor: Such portions of the course outlined above as seem most appropriate to their other subjects are given to students taking entomology as a minor.

HORTICULTURE. — The work in horticulture necessarily varies considerably with different candidates, since its most important features are specialization, original investigation and the development of individual initiative in dealing with new questions. Each candidate must select some special field of horticultural study, and devote himself to it continuously. He will be required to attend lectures, conferences and seminars dealing with horticulture in its broader aspects, and to do advanced work in the following subjects: —

(*a*) Systematic pomology.
(*b*) Pomological practice.
(*c*) Commercial pomology.
(*d*) Systematic, practical and commercial olericulture.
(*e*) Greenhouse plants and problems.
(*f*) Floriculture.
(*g*) Landscape gardening.
(*h*) Plant breeding and general evolution.
(*i*) Questions of physiology connected with propagation and pruning.

Other requirements and opportunities are (1) periodical seminars, with special lectures by prominent men from outside the college; (2) extensive and systematically planned readings; (3) frequent visits, always with definite purpose, to orchards, gardens, greenhouses, estates and libraries outside the college grounds; and (4) the preparation and publication of a thesis which shall set forth the results of the candidate's major study, and be an original and positive contribution to horticultural knowledge.

(*b*) *Minor Courses.*

ZOÖLOGY. — The courses in zoölogy are offered as a minor course to candidates for the degree of doctor of philosophy. They constitute an intensive course designed to give a broad outlook and to meet the needs of the specialist, and call for original investigation, laboratory dissection, technique and museum work. The subjects treated and the work done will vary according to circumstances, but may be outlined thus: —

(*a*) General and comparative anatomy, both gross and microscopic; ontogeny and phylogeny; life cycles, metamorphosis and metagenesis; animal associations, colonial, commensal and parasitic, and symbiotic associations of animals and plants; adaptation, adaptive radiation and parallelisms.

(*b*) Geologic, geographic and bathymetric distribution of animals.

(*c*) Systematic zoölogy, including paleozoölogy; museum and field technique.

(*d*) Economic zoölogy.

(*e*) History and development of zoölogical science.

(*f*) Weekly seminar and journal club meetings, in which all advanced students of zoölogy take an active part.

(*g*) Collateral reading; general knowledge of current zoölogical literature.

OTHER SUBJECTS. — Courses in the other subjects open to choice as minors will be outlined according to the qualification and needs of the students applying for them.

EXTENSION WORK.

EXTENSION WORK.

The extension work of the college includes the short courses and the outside activities, such as correspondence courses, lecture courses and itinerant instruction of various forms away from the college.

SHORT COURSES.

A. Organization, Expenses and Admission.
B. The Winter School.
C. The Summer School.
D. Itinerant Instruction.

A. ORGANIZATION, EXPENSES AND ADMISSION.

ORGANIZATION. — The work of the short courses in the college was organized in September, 1909, with a director in charge.

The object of the short course work is three fold: —

(1) To bring to the college for instruction for a few days or a few weeks as many people as can possibly be reached in this way.

(2) To disseminate, by various methods, agricultural information to people who cannot come to the college even for a short time.

(3) To make the college as useful as possible to all the people of the Commonwealth who are interested in agriculture and country life.

The work has been organized thus: —

1. The Winter School.

Ten weeks' general course.
Poultry course.
Farmers' week.
Beekeepers' course.

2. The Summer School.

Courses in practical agriculture and horticulture.

Courses in elementary sciences bearing on agriculture and horticulture.

Home economics.

Courses in agricultural education.

Courses in agricultural economics and rural sociology.

Courses especially for clergymen and rural social workers.

Conferences for clergymen, school superintendents, librarians and others.

Evening lectures by eminent educators.

Excursions to various points of interest in the vicinity.

3. *Itinerant Instruction.*

Correspondence courses.
Lecture courses.
Practical field demonstrations.
Travelling schools.
Educational trains (steam and trolley).
Educational exhibits at fairs.
Demonstration orchards.
Demonstration field experiments.
Services of expert agricultural authorities.
Agricultural surveys.
Advisory work with schools, State institutions and individuals.
Student extension work.

Expenses in the Short Courses. — The expenses of attending either of the short courses will be about as follows: —

Tuition to citizens of the United States,	Free.
Furnished rooms with private families, per week,	$1–$3
Board at college dining hall, per week,	$4
Board with private families, per week,	$4–$5

Students in either of the dairy courses must provide themselves with two white wash suits and a white cap for use in the practical dairy work; the cost in Amherst is about $1.25 for suit and cap.

Requirements for Admission to Short Courses. — No entrance examinations are required, but students are advised to review their school work in English and arithmetic before entering. Practical experience in farm, garden, orchard or greenhouse work will be an advantage. The courses are open to both men and women. Students must be at least eighteen years of age, and must furnish satisfactory evidence of good moral character.

Application for admission should be made as early as possible. Students should report to the professor in charge on Monday, Jan. 2, 1911, in order to begin work promptly on the morning of January 3.

B. THE WINTER SCHOOL.

1. The Ten Weeks' Course.
2. The Short Course in Poultry Management.
3. Farmers' Week.
4. Beekeepers' Course.

1. THE TEN WEEKS' GENERAL COURSE.

JAN. 3–MARCH 10, 1911.

AGRICULTURE, DAIRYING, FRUIT GROWING, FLORICULTURE, MARKET GARDENING, VETERINARY SCIENCE, ETC.

a. Courses of Instruction.
b. Other Information.

a. Courses of Instruction.

1. Soil fertility. Prof. WM. D. HURD. Three exercises a week for eight weeks.
2. Market gardening. Mr. C. S. HELLER. Three exercises each week for ten weeks.
3. Fruit growing. Prof. F. C. SEARS. Five exercises each week for ten weeks.
4. Floriculture. Prof. E. A. WHITE. Five exercises each week.
5. Field crops. Prof. S. B. HASKELL. Three exercises each week for ten weeks.
6. Breeds and breeding. Prof. J. A. McLEAN. Three exercises weekly, with appointed hours for stock judging.
7. Feeding and management. Prof. J. A. McLEAN. Two exercises weekly.
8. Animal diseases and stable sanitation. Dr. J. B. PAIGE. Two exercises each week.
9. Dairying. Prof. W. P. B. LOCKWOOD and assistants. Three one-hour, 2 two-hour and 2 three-hour periods.
10. Dairy bacteriology. Prof. W. P. B. LOCKWOOD. Two exercises each week.
11. Botany. Prof. A. V. OSMUN and others. Three exercises each week.
12. Entomology. Dr. H. T. FERNALD and assistants. Three exercises each week.
13. Mechanics. Prof. W. P. B. LOCKWOOD and Mr. WALLACE. One exercise of two hours each week.
14. Farm accounts. Prof. J. A. FOORD. One exercise each week.
15. Farm buildings and machinery. Prof. J. A. FOORD and Mr. E. H. FORRISTALL. One exercise a week for ten weeks.
16. Landscape gardening. Mr. JOHN NOYES. Twenty exercises.
17. The farmer and the community. Two periods a week.
    The development of the rural community, President BUTTERFIELD.
    Farm labor, immigration and farmers' organizations, Dr. CANCE.
    The government in rural communities, Professor EYERLY.
    The educational problems of rural communities, Professor HART.
    Agricultural literature, Professor HOLCOMB.

18. Forestry. Prof. F. F. Moon. Six lectures.
19. Meat, meat production and marketing on the farm. Mr. H. P. Hinkley of Armour & Co. One demonstration each fortnight.

b. Other Information.

Assembly. — All students of the college are required to attend a weekly assembly, at which an address of general interest is usually given. Attendance at morning chapel service, four times each week, is also required.

2. Poultry Course.

February 27 to March 10, 1911.

The purpose of this course is to give information to people interested in the poultry business.

Some of the best authorities on the subject of poultry breeding and management in this country have been secured to give the lectures and practical demonstrations.

An effort will be made to make the course a "practical" one, touching the vital problems of the poultry business.

Classes begin Monday, February 27, at 2 p.m.

Instruction will be given by specialists in poultry management, as follows: —

Prof. J. C. Graham, Professor of Poultry Husbandry.
Mr. John H. Robinson, Boston, Mass., editor of "Farm Poultry," author, and recognized authority on poultry subjects.
Prof. James E. Rice, Professor of Poultry Husbandry, Cornell University, Ithaca, N. Y.
Mr. Edwin F. Gaskill, in charge of poultry experiments at Massachusetts Experiment Station, Amherst, Mass.
Mr. D. J. Lambert, in charge of poultry work at Rhode Island State College, Kingston, R. I.
Mr. Henry D. Smith, Rockland, Mass.

Besides the poultry specialists mentioned above, the following members of the faculty of the Massachusetts Agricultural College will also give instruction in the poultry course: —

Prof. William D. Hurd, Director of Extension Work.
Dr. James B. Paige, Professor of Veterinary Science.
Prof. Fred C. Sears, Professor of Pomology.
Mr. C. S. Heller, Instructor in Vegetable Gardening.
J. A. McLean, Professor of Animal Husbandry.
Mr. Clarence A. Jewett, Superintendent of Buildings.

Special Evening Lectures and Other Features.

Throughout the course evening lectures of a popular nature will be given.

The poultry course occurs during the last two weeks of the ten weeks' short winter course, so that those who attend the poultry course may take advantage of the lectures offered in this course as well.

Farmers' week occurs at the college the week following the close of the poultry course. Every one should plan to remain over for this.

Trips will be made to nearby commercial poultry plants to study methods, etc.

Poultry Show.

On March 8, 9 and 10, in connection with the work of the short poultry course, a poultry show will be held. This will be organized along the lines of any well-conducted show, the idea being to give the students training in preparing birds for exhibition and in showing them.

Send for entry blanks.

3. FARMERS' WEEK.

MARCH 13–17, 1911.

The work given in the 1910 farmers' week was as follows. A broader and more complete program will be carried out the present year.

Purpose and Organization of Farmers' Week.

Farmers' week is given by the Massachusetts Agricultural College for the benefit of those who cannot leave their homes or business for a sufficient length of time to take the other short courses.

Farmers' week is divided into sections, so that all who attend may find work of interest to them in progress each day.

1. General agricultural section, — including animal husbandry, dairying and poultry raising. Features of this section are "corn day," with a big corn show, and "dairy day," with exhibits of dairy machinery and dairy products.

2. General horticultural section,— including fruit growing, market gardening, floriculture and forestry. A feature of this section is "apple day."

3. Women's section, — home economics, domestic science and home making.

Eminent people are secured for the evening meetings. One day is given up to a discussion of problems of "community building."

4. BEEKEEPERS' COURSE.

MAY 24–JUNE 7, 1911.

Announcement.[1]

Throughout the year the Massachusetts Agricultural College has been receiving calls for a course in beekeeping. To meet the demand, a short course, covering the lines indicated, has been arranged.

During the past year the college has come into possession of about twenty colonies of bees and some other equipment. These, together with the swarms owned by the college faculty, will give most excellent equipment.

The work as laid out is of the most practical nature, and every attempt will be made to emphasize the points which are of the most value, yet are little understood by those engaged in this industry.

The following experts in beekeeping have given the work: —

Courses and Faculty.

1. Practical phases of beekeeping. Dr. BURTON N. GATES.
2. Crops for honey bees. Dr. WM. P. BROOKS.
3. The relation of bees to the pollination of plants. Dr. GEORGE E. STONE.
4. The origin and evolution of the honey bee. Dr. HENRY T. FERNALD.
5. Bees and beekeepers' supplies. Dr. JAMES B. PAIGE.

C. THE SUMMER SCHOOL.[2]

JULY 3–AUG. 4, 1911.

1. Announcement, Purpose, Plan.
2. Faculty.
3. Election of Courses.
4. Conference for Rural Social Workers.

1. Announcement and General Plans.

The summer school of agriculture and country life at the Massachusetts Agricultural College opened July 11, 1910, for a term of nearly five weeks, closing August 12. This was the fourth session of this summer school, those of the past three years having been highly successful. The experience of these three years aided in making material improvements for the session of 1910.

---

[1] 1910 course; 1911 course not yet ready.

[2] Description here given is for the 1910 school.

The work of the summer school was designed originally for school teachers, and the attendance has been largely of that class. Special attention will be given to the needs of teachers again this year. It has been found, however, that there are many persons who seek a general knowledge of theoretical and practical agriculture, and who can come to the college conveniently during the summer season. Extended courses will be offered for the benefit of such persons also.

From the courses it will be possible to make up programs of work suitable to the needs of almost every one, but especially to school teachers, principals, superintendents, school committeemen, farm owners, householders, suburban residents, clergymen, pastors, preachers, social workers, and those who have only a general interest in agriculture. Persons who are in doubt as to what courses will best suit their needs would better correspond with the director of the summer school, who will gladly advise in all such matters.

The formal instruction in the summer school was given in thirty definite courses, herein described. From these each pupil might elect courses providing not less than ten nor more than fifteen exercises a week, unless a larger or smaller amount of work be allowed by the director. These courses included a large amount of field work, observation trips, outdoor exercises and laboratory experiments.

Besides these, general field exercises will be arranged for one afternoon of each week. These will be on topics of interest to all. Class excursions will be arranged for every Wednesday afternoon, and more extended excursions for the whole school will be planned for every Saturday. These excursions will be in charge of an instructor as heretofore. In the past they have proved a very enjoyable feature of the work.

Round tables and special discussions will be arranged by various instructors as their courses require. A conference of rural social workers and educators of New England was held August 9, 10, 11 and 12. An outline of the conference will be found in another part of this bulletin.

A course of evening lectures on popular topics relating to the work of the school was a feature of the general program. Like everything else connected with the summer school this lecture course is entirely free to all students.

2. *Faculty.*

1. Soils and tillage. Assistant Prof. S. B. Haskell. Five exercises weekly the first two weeks. Should be followed by Course 2.
2. Field crops. Assistant Prof. S. B. Haskell. Five exercises each week for second two weeks. Should be preceded by Course 1.
3. Fruit growing. Prof. F. C. Sears. Limited to 30 pupils. Five exercises weekly for four weeks.
4. Practical gardening. Mr. C. S. Heller. Course limited to 20 pupils. Five exercises weekly, two hours each, first four weeks.
5. The study of landscape. Prof. E. A. White. Five exercises weekly, first two weeks.
6. Trees and shrubs. Prof. E. A. White. Five exercises weekly, second two weeks of the term. This course is especially suited to follow Course 5 and to precede Course 7.
7. Forestry. Prof. E. A. White. Lectures and field exercises, five exercises weekly.
8. Domestic animals. Mr. R. L. Gribben. Five hours a week, first four weeks.
9. Modern dairying. Associate Prof. W. P. B. Lockwood. Five exercises weekly for four weeks.
10. School gardening. Prof. W. R. Hart. Five exercises a week, first two weeks.
11. Agricultural pedagogy. Prof. W. R. Hart. Five exercises weekly, beginning July 25.
12. School agriculture. Assistant Prof. F. B. Jenks. Five exercises weekly for four weeks.
13. Elementary chemistry. Associate Prof. J. Chamberlain and Assistant Prof. F. S. Howard. Five exercises weekly for four weeks.
14. Agricultural high school chemistry. Associate Prof. J. Chamberlain and Assistant Prof. F. S. Howard. Five hours a week, four weeks.
15. Plant experiments. Prof. G. E. Stone. Five exercises weekly for two weeks.
16. Plant life. Assistant Prof. A. V. Osmun. Five lectures weekly for two weeks, beginning July 25.
17. Cryptogamic botany. Assistant Prof. A. V. Osmun. Two three-hour exercises weekly for two weeks.
18. Bird life. Mr. C. J. Maynard. Five exercises weekly, first two weeks.
19. Insect life. Mr. R. Matheson. Three class and two laboratory periods for four weeks.
20. Entomology. Mr. R. Matheson. Three lectures and two laboratory periods for four weeks.
21. Domestic science for rural school teachers. Miss H. Rinaker. Three lectures and two cooking demonstrations weekly for four weeks.
22. Domestic science and home economics. Miss H. Rinaker. Three lectures and two demonstrations weekly for four weeks.
23. Household science. Miss H. Rinaker. Three lectures and two demonstrations of cooking weekly, beginning July 25.
24. New England agriculture. Prof. W. D. Hurd. Five exercises weekly.

25. Agricultural economics. Assistant Prof. A. E. CANCE. Five lectures weekly.
26. Development of the rural community. President K. L. BUTTERFIELD. Lasts two weeks.
27. The church and the rural problem. Rev. W. L. ANDERSON. Five lectures weekly.
28. The country school and the rural community. Miss M. CARNEY. Lectures beginning August 1.
29. Forms of co-operation among farmers. Assistant Prof. E. K. EYERLY. Ten lectures.
30. Rural literature. Mr. G. M. HOLCOMB. Ten lectures.
31. The movement in agricultural education. Prof. W. R. HART. Ten lectures.

3. *Election of Courses.*

Election of courses should be made at the time of registration. Every election is subject to the approval of the director and of the instructor whose course is elected. As it will be necessary to schedule several courses at the same hour, certain combinations of courses will be made unavailable. It should be especially noticed that certain courses are offered to a limited number of pupils only, and, as a rule, pupils will be accepted in these courses in the order of application. Each pupil should choose such combinations of courses as will keep two or three subjects in hand at the same time. This will meet the requirement that each one must take at least ten and not more than fifteen exercises a week, unless permitted to take more or less by special order of the director.

Attendance will be required in the courses elected. Some sort of examination, test or permanent note-book will be required in each course. Those who complete the courses in a satisfactory manner, including practically perfect attendance, will be given certificates at the close of the term showing what work has thus been completed.

There are no rules or regulations whatever. Persons are not admitted to the summer school who are not old enough to know how to behave, and every one is expected to know and conform to the usages of good society. This absence of rules has worked admirably in the past, and it gives every one a sense of freedom based on personal responsibility, the basis of all proper government, whether in school, college or the community.

4. Conference of Agricultural Educators and Rural Social Workers.

The last four days of the summer school will be given over to a conference of agricultural educators, rural social workers and others who are interested in developing country life. As its name indicates, this will be a conference in every sense of the word, every one being expected to take part in the informal discussions.

It is expected that persons representing the following lines of work will be present: rural school teachers, grade teachers of agriculture, high school teachers of agriculture, college teachers of agriculture, rural clergymen, rural librarians, grange lecturers, village improvement societies and others.

The plan of the program will be as follows: each of the above sections of workers will be asked to arrange a program, covering two hours in length, for their respective sections each forenoon. An afternoon general section will be held, at which some subject, such as the education of rural communities, the social life of rural communities, the religious life of rural communities, and the organization of forces for rural betterment, will be taken up each day.

Among the prominent speakers at the 1910 conference were Dr. S. A. Knapp of Washington, D. C., Dr. Josiah Strong of New York City, and Prof. Charles Zueblin of Winchester, Mass.

The bulletin of the 1911 summer school will be ready about March 1, and can be had by applying to the director.

D. ITINERANT INSTRUCTION.

1. **Correspondence Courses.**
2. **Lecture Courses.**
3. **Other Itinerant Instruction.**

1. THE CORRESPONDENCE COURSES.

a. Purpose and Description of the Work.

The correspondence courses announced in this circular are offered by the Massachusetts Agricultural College in response to calls from all sections of the State, from people who desire agricultural information, but who, for various reasons, cannot come to the college for it. These courses are designed to meet the needs of farmers, dairymen, stock breeders, fruit growers, market gardeners, floriculturists and teachers, either in elementary schools, high schools, academies or normal schools.

Since agricultural science and practice have changed and are changing so rapidly, it is the purpose to give a summary of the latest information on the subjects treated, yet in such language that any who pursue the study can readily understand the work. Additional courses, covering other subjects, will be added later.

b. Method of conducting the Work.

While a large number of books have been written on various agricultural subjects, few of them are especially adapted to correspondence course work. For this reason our courses are conducted principally by especially prepared lessons. These lessons partake somewhat of the nature of the lectures given in the regular college work. Whenever possible, a text-book is used for reference and supplementary study.

The lessons are sent out one at a time by the college, and are either accompanied or followed by a list of questions. When these are satisfactorily answered or discussed, the next lesson is sent, and so on.

It is recommended that students take up the work in some logical order, *i.e.*, the courses in "soils" and "manures and fertilizers" should precede those in "field crops," "fruit growing" or "market gardening."

After these preliminary courses have been completed, two or more courses of study may be pursued at the same time, provided the student can devote sufficient time to the work to carry it on successfully.

The courses are especially recommended to granges for study, and it is to be hoped that grange lecturers, or some other interested person, will organize study classes. When this is done, a representative of the college will visit the grange from time to time to conduct the class, discuss the work and offer suggestions.

c. Description of Courses.

1. Soil and soil improvement. Prof. W. D. Hurd. The cost of the course is $1.
2. Manures and fertilizers. Prof. W. D. Hurd. The cost of the course is $1.
3. Field crops. Assistant Prof. S. B. Haskell. The cost of the course is $1.
4. Farm dairying. Associate Prof. W. P. B. Lockwood. The cost of the course is $1.

5. Fruit growing. Prof. F. C. Sears and Mr. A. J. Norman. The cost of the course is $1.
6. Market gardening. Mr. C. S. Heller. The cost of the course, including the text-book, is $2.50.
7. Animal feeding. Mr. R. L. Gribben and Mr. C. J. Robinson. The cost of the course is $1.
8. Floriculture. Prof. E. A. White. The cost of the course is $1.
9. Farm accounts. Prof. J. A. Foord. The cost of the course is $1.
10. Agriculture in the common schools. Assistant Prof. F. B. Jenks. The cost of the course, including the text-book, is $2.10.
11. Agricultural education. Prof. W. R. Hart. The cost of the course is $1.
12. Beekeeping. Assistant Prof. B. N. Gates. The cost of the course is $1.
13. Forestry. Associate Prof. F. F. Moon. The cost of the course is $1.

d. Expenses of the Courses.

In order that none shall enroll but those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at the uniform rate of $1 for each course, payable in advance at the time of enrollment.

This fee is not charged to cover cost of preparing the course, for this, in time of the instructors, is many times what is received, but it is to defray expenses of postage and material used in the preparation of the lessons, and to insure a higher quality of work from those who enroll.

The cost of a text-book, when one is used, is in addition to this enrollment fee.

Remittances should be made by money order or check.

e. Enrollment.

Students may enroll at any time by applying to the director of extension work, either personally or by letter. Enrollment should be made on the card which is furnished by the college.

Membership in the correspondence courses entitles the student to receive the books used in the various courses, and others, at reduced prices.

f. List of Reference Books for Supplementary Reading.

For those who desire to add some of the latest books to their libraries, for teachers who wish material for their work, or for librarians who desire to place on the shelves of their libraries, the latest agricultural publications, arrangements have been made with the Orange Judd Publishing Company, Lafayette Place, New York City, N. Y., to supply books at reduced prices.

A classified list giving prices (postpaid) will be furnished by the college to all who apply for it.

2. THE LECTURE COURSES.

The college also offers lecture courses. The lectures can be obtained by any agricultural organization, grange, farmers' club, board of trade, women's club, Young Men's Christian Association, church club or school, or by others who are interested in problems pertaining to agriculture and country life. Single lectures, or a series comprising a course, can be arranged for.

LECTURES AND SUBJECTS. — The faculty of the college are, of course, men busy with regular college duties, and can undertake only so many outside lectures as will not seriously interfere with their regular college work. For this reason it is advisable that those desiring lectures for a fixed date should make a second, and perhaps a third, choice, also, of lecturers, in order to secure some one.

A Lecture without a Lecturer.

The college is now prepared to send a stereopticon, a written lecture and a set of lantern slides to accompany the lecture to responsible persons who desire to use these before public gatherings. A rental fee of $1 and express both ways is charged. The following lectures will be ready for the winter of 1910–11: —

Clean milk, production and handling.
Apple growing.
Types and breeds of animals.
History, uses and culture of corn.
Potato growing.
The organization and work of the Massachusetts Agricultural College.
Home and school ground decoration.
Teaching agriculture, school gardening, etc., in the public schools.
Concrete: its use on the farm.

Other subjects will be announced later.

The Practical Demonstrations.

The college is prepared to send an expert who will bring with him the necessary apparatus, whenever possible, to give practical demonstrations of different operations connected with agricultural practice. The following are some of the demonstrations most commonly given: —

The production and handling of clean milk.
Babcock milk testing.
Scoring and judging live stock.
Spraying fruit trees.
Packing apples.
Pruning and grafting.
Scoring and judging fruit.
Corn selection and judging.
Demonstrations in beekeeping as announced by Dr. Gates in circular.

Others may be given when requested.

Terms on which Lectures and Demonstrations are given.

The idea of offering these lectures to the public is that as large a number of people of the State may receive the instruction as is possible. When no admission fee is charged, the lectures and object lessons will be given free, provided the organization or individual requesting the lecture will pay the traveling expenses of the person giving the lecture. When admission is charged, the lecturer shall receive compensation in addition to his traveling expenses.

Correspondence is invited regarding the selection of subjects for a course of lectures.

3. OTHER ITINERANT INSTRUCTION.

Besides the correspondence and lecture courses and the practical field demonstrations, the college is carrying on several kinds of itinerant instruction. Calls are constantly made on the college for help to be given at a distance from the institution; and to meet these calls a corps of field agents is being engaged. These men and women will serve as traveling instructors, giving instruction varying in length from a single lecture to traveling-school courses lasting several days.

DEMONSTRATION ORCHARDS. — The college is establishing these orchards in all sections of the State. The owner of the land furnishes four or five acres and signs a contract to carry out the instructions of the college for fifteen years. The college furnishes the trees, a spraying outfit and the necessary supervision free of charge. Renovation plots in neglected orchards are also taken by the college for improvement for a period of five years. Educational meetings are held at these orchards each season.

EDUCATIONAL TRAINS. — In the past year a train consisting of five cars, extensively equipped with demonstration apparatus, was run over the lines of the Boston & Albany Railroad. A trolley train of five cars was run over the trolley lines centering in Springfield. Fifteen lecturers and demonstrators accompanied these trains.

EDUCATIONAL EXHIBITS AT FAIRS. — The college makes exhibits at the principal fairs in the State. In connection with these exhibits an extensive lecture program is given.

TRAVELING SCHOOLS. — When so requested the college organizes itinerant schools of instruction, lasting from three to five days, in good agricultural centers. The program is somewhat similar to that given at the college "farmers' week." The program is given without cost, providing the cost of halls and advertising is met by the community where the school is held.

TRAVELING LIBRARIES. — To meet an increasing demand for information concerning agricultural books the college is preparing to send to libraries and schools a collection of some of the best books on agriculture and allied subjects.

Extension Work by Students.

In order to aid in a practical way in the solution of the problems in the rural community, a new line of work has been undertaken by the extension department as student extension work.

Members of the college Young Men's Christian Association who have shown ability in community building are largely employed in this form of extension. The object of the work is two-fold: (1) to develop the country boy and acquaint him with the possibilities of the farm, indirectly reaching his parents and ultimately amalgamating the various factors of the community for the purpose of fostering a more wholesome community spirit; (2) to train the college students to cope with the rural problem in order that later they may exercise the right leadership in the community.

The work is being developed with regard to religious, educational, social and physical interests. The religious work embraces the teaching of Bible classes, leadership in singing at Christian Endeavor and other meetings, the holding of meetings in different towns by members of the college Young Men's Christian Association, the encouragement of church socials, etc.

The educational work includes study of the social and economic problems of the town, the teaching of English to foreigners, conducting classes in agriculture, with practical work, lecturing on agricultural subjects, beautifying home grounds, developing home flower gardens, leading nature-study tramps, organizing debates and encouraging boys to further schooling.

The social effort is to encourage and develop all activities in town tending to create a broader and more unified community interest; such activities are church entertainments, school entertainments, musicals, etc.

Physical education is given through talks about clean living and physical culture, and by development of different branches of athletics under efficient moral leadership.

The plan involves much competition, tending to bring the people of the different towns into a closer relationship.

The work thus far has been confined to those communities within easy reach of the college, but it will gradually extend over a wider area. The work is popular and promises to become one of the most important agencies in the development of the rural community.

Miscellaneous Itinerant Instruction.

A number of other kinds of work are demanded of the college through the extension work. Among these might be mentioned aid in the organization of crop and animal improvement societies, the conducting of demonstration experiments and plot tests in all sections of the State, making agricultural surveys, doing advisory work with schools, State institutions and individuals, furnishing the services of agricultural experts to those who need help, giving advice on farm management, and answering thousands of inquiries each year.

In short, the spirit of the extension work is that of service, and an effort is made through it to render the departments of the Massachusetts Agricultural College as helpful to the people of the Commonwealth as they can be. Correspondence is invited from any who desire such help as has been spoken of. Letters should be addressed to the Director of Extension Work, Massachusetts Agricultural College, Amherst, Mass.

GENERAL INFORMATION.

GENERAL INFORMATION.

A. FINANCIAL AND ADMINISTRATIVE.

STUDENT EXPENSES.

TUITION. — Tuition is free to citizens of the United States; but students who are citizens of Massachusetts should apply to the senator of the district in which they live for a free scholarship. Blank application forms may be obtained from the registrar. The tuition charged persons not citizens of the United States is $120 a year.

DORMITORIES AND BOARD. — The college has dormitory accommodation for about 64 students. The rooms in the dormitories are occupied chiefly by the upper classmen, hence new students are obliged to room in private houses. The rooms in the college dormitories are unfurnished. They are mostly in suites of three, — one study room and two bed rooms. They are heated with steam and lighted with electricity. Students care for their rooms themselves. The rent for each person ranges from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1.50 to $3 a week for each occupant. All correspondence in regard to rooms should be addressed to the dean of the college.

Board can be had at the college dining hall. Board is furnished at cost. At present the price of board is $4 a week. The price is determined by adding to the audited rate of the previous three months' period 5 per cent. At the end of the period, final settlement is made on the basis of actual cost.

EXPENSES.

The necessary college expenses per year are estimated as follows: —

Tuition: Citizens of Massachusetts free through State scholarships; other citizens of the United States free; foreigners, $120 a year.

	Low.	High.
Room in college dormitories or in private houses,	$39 00	$110 00
Board in college dining hall, $4 a week,	144 00	144 00
Laundry, 50 cents to 85 cents a week,	18 00	30 00
Military uniforms, first year,	13 50	13 50
Laboratory fees,	2 00	20 00
Books, stationery and other miscellaneous,	23 50	32 50
	$240 00	$350 00

Other Expenses. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial demands made upon students which they should expect to meet. Chief among these are class assessments, support for the Musical Association and the Y. M. C. A., and taxes levied for maintenance of various student organizations, such as the Social Union, Athletic Association, college " Signal " (paper), etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is assumed by students joining a fraternity. Students rooming in college dormitories are obliged to equip their rooms with furniture. The college assumes no responsibility in regard to the safe-keeping of student furniture in dormitories, either during term time or vacation, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling the economical student will probably spend between $250 and $350 a year.

Student Aid.

Self Help. — A number of students find opportunities for earning money without depending on the labor fund, and many rely upon labor of some sort to earn their way through college. A few men have paid all their way through college; a great many more have paid a large part of their expenses; and many have earned a small proportion of the cost of their course. But the college recommends that no new student enter without having at least $150 with which to pay his way until he can establish himself at work. The college does not encourage students to enter without money in the expectation of earning their way. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in college, or, instead, to borrow money with which to complete his course. No student should undertake work that interferes with his studies, and students should remember that, owing to the large number of applications for labor-fund employment, no one man can receive a large amount from that source.

Labor Fund. — An annual appropriation of $7,500 for student labor is received from the State. So far as possible needy students will be employed in some department of the college. The Department of Agriculture and the Department of Horticulture usually afford the most work. Application for student labor should be made directly to the president. Applicants must present a certificate signed by parent or guardian and by one of the selectmen of the town in which they reside, showing that they need the aid. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor.

SPECIAL NOTICE TO NEEDY STUDENTS. — *In the last year or two the demand for paid labor on the part of new students has exceeded the amount of employment that the college can offer. The college cannot promise work for any students, particularly freshmen. It accordingly urges prospective students who are dependent upon their own efforts not to undertake the course before they have enough money to carry them through or nearly through the first year.*

STUDENT ACCOUNTS.

The following rules are in force concerning student accounts: —

No student will be allowed to graduate until all bills due from him to the institution are paid.

College charges, such as room rent, laboratory fees, tuition, etc., must be paid strictly in advance at the beginning of each semester. No student will be allowed to register until such payments are made.

Every student boarding at Draper Hall shall pay at the beginning of each semester at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if more than one week in arrears in his payments.

All money due for student labor shall be applied on account toward any bills that the student may owe to the institution.

LABORATORY FEES.

	Per Semester.
Botany: —	
Graduates,	$4 00
Courses 2, 3,	3 00
Course 4,	2 00
Course 5,	1 00
Courses 7, 9, 11, 13,	3 00
Chemistry: —	
Courses 1, 2, 11, 13 and 14, each,	3 00
Courses 4, 5 and 6, each,	4 00
Courses 9, 10, 15, 17A, B, C or D, 18A, B, C or D,	5 00
Entomology: —	
Graduate,	3 00
Entomology 3,	3 00
Entomology 4,	3 00
Landscape gardening: —	
Landscape gardening 1, 2,	2 50
Landscape gardening 3, 4, 7, 8,	4 00
Landscape gardening 6,	1 00
Drawing 1, 2,	2 50
Zoölogy: —	
Elementary 1,	2 00
Invertebrate 3,	4 00
Vertebrate 4,	4 00

B. ACADEMIC AND DEPARTMENTAL.

DEGREES.

Those who complete the four-years course receive the degree of bachelor of science. Those who receive this degree may also, upon payment of a fee, receive the degree of bachelor of science (B.Sc.) from Boston University; but the candidate must meet the conditions imposed by the university concerning preparatory studies. The fee for graduation from the college is $5; that for the degree of Boston University is $10.

Graduate students who complete the assigned courses will receive the degree of master of science (M.Sc.) (fee, $10). Credit may sometimes be allowed toward this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-years course of study and present a satisfactory thesis will be granted the degree of doctor of philosophy (fee, $25).

Those to whom degrees are awarded must present themselves in person at commencement to receive them. Honorary degrees are not conferred.

SCHOLARSHIPS AND PRIZES.

Scholarships.

The income of gifts from different persons is distributed in scholarships to worthy students requiring aid. The funds supporting these scholarships are: —

1. The Mary Robinson fund of $1,000, the bequest of Miss Mary Robinson of Medfield.
2. The Whiting Street fund of $1,000, the bequest of Whiting Street of Northampton.
3. The Henry Gassett fund of $1,000, the bequest of Henry Gassett of North Weymouth.

Prizes.

Prizes are given annually in several departments for excellence in study or for special achievement. The prizes offered for 1910 are: —

AGRICULTURE. — The Grinnell prizes (first, second and third), given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. They are $25, $15 and $10.

BOTANY. — The Hills prizes (amounting to $35), given by Henry F. Hills of Amherst, will be awarded to members of the senior class as follows: for the best herbarium, $15; for the best collection of Massachusetts trees and shrubs, $10; for the best collection of Massachusetts woods, $10. No collection deemed unworthy of a prize will be considered. In 1911, a prize of $5 is offered to that member of the sophomore class who presents the best herbarium of native flowering plants.

FORESTRY. — The J. W. D. French prize ($25) is given by the Bay State Agricultural Society to that member of the senior class who writes the best essay on forestry.

GENERAL IMPROVEMENT. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who during his first two years in college has shown the greatest improvement in scholarship, character and example.

PUBLIC SPEAKING. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declarations in the Burnham contest, $15 and $10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, a gold medal and $20 and $15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and $15. The preliminary contests in debate are open, under certain restrictions, to all regular students.

Winter Course Prizes for 1910.

Given by the Bowker Fertilizer Company, Boston, to the student who is most familiar with the nature and composition of fertilizers and their use, one-half ton Stockbridge fertilizer.

Military Diplomas.

Military diplomas are given to those men receiving the degree of bachelor of science who by their work in the Department of Military Science have shown themselves worthy of distinction.

These diplomas recommend those receiving them for commissions in the United States army or the militia of the several States.

EQUIPMENT.

AGRONOMY. — The work in agronomy is carried on by means of lectures, laboratory work and field work. The laboratories are in the north wing of South College. The seed laboratory is equipped with samples of the different grains and seeds of economic importance in field culture, and with apparatus for the study and testing of these seeds, including microscopes and the apparatus necessary for viability and purity tests. The soil laboratory is well equipped with apparatus for the study of the physical properties of soils, including an electric centrifuge; an electric resistance thermometer for determining soil and other temperatures; evaporimeters and drying ovens; and good balances. For the work in drainage there is available a surveyor's transit, a wye level, drainage levels, rods, steel tapes, surveyors' pins, and a set of drainage tools. The college farm may also be considered a part of the agronomy laboratory.

ANIMAL HUSBANDRY. — The most important part of the equipment for laboratory work in animal husbandry is the new judging pavilion, which will be completed by Jan. 1, 1911. This will give new opportunities for practice work in management of live stock, together with demonstrations in judging. Another very essential part of the equipment for this department is the live stock of the college farm, which includes pure bred and grade Ayrshire, Guernsey, Holstein and Jersey cattle, French coach and Percheron horses, and Berkshire swine. A set of plaster-of-paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different food stuffs available for the use of the New England farmer, are included in the equipment for this work.

BOTANY. — The department of botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for sophomore and junior work, and one for senior work; and three rooms specially fitted for graduate students. The experiment station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with all necessary conveniences. The basement contains a bacteriological laboratory, a seed and soil room; and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe, and other tools and appliances. In the senior laboratory, is a room designed especially for physiological work; this laboratory is well supplied also with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc. The herbarium contains 15,000 species of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and about 12,000 sheets of fungi. The laboratory is equipped with 90 modern compound microscopes and a number of dissecting microscopes, microtomes and a large series of charts. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experiment work and for housing material often needed in the laboratory.

CHEMISTRY. — The department of chemistry has rooms adapted to chemical uses, supplied with a large assortment of apparatus and chemical materials. The lecture room on the second floor seats 70 students. Immediately adjoining it are four smaller rooms for apparatus and the preparation of materials for the lecture table. The laboratory for beginners is furnished with 40 working-tables. Each table is provided with reagents and apparatus for independent work. A well-equipped laboratory for advanced work is also provided. The weighing room has 6 balances and improved apparatus for determining densities of solids, liquids and gases. The equipment includes also a microscope, a spectroscope, a polariscope, a photometer, a barometer, numerous models, and an extensive collection of industrial charts, and there is a valuable and growing collection of specimens and samples. The latter includes rocks, minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products and artificial preparations of mineral and organic compounds. With this should also be mentioned a series of preparations used for illustrating the various stages of different manufactures, from raw material to finished product.

DAIRYING. — Two large, well-drained, cement-floored rooms in the South College are used for dairy work. These are equipped with a milk heater, separators, coolers and aërators, a pasteurizer, ripening vats, churns, butter workers, a mechanical can washer, a sterilizer, and other small apparatus necessary to a well-equipped dairy or butter factory. A third room is equipped with hand and power Babcock milk-testing machines and other apparatus used for milk and butter testing. These rooms have individual lockers for students. The new sanitary dairy and stable give an opportunity for practical laboratory work in the production and handling of certified milk.

DINING HALL. — Draper Hall, a brick colonial building, equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college.

DRAWING. — Two rooms on the second floor of Wilder Hall are occupied by the classes in drawing. They are equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details, and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

ENTOMOLOGY. — *Entomological Laboratories.* — The equipment for work in entomology is perhaps unexcelled in this country. In the new fireproof entomological and zoölogical building, first used in the fall of 1910, are fine lecture rooms, laboratories and museums for use in the different courses. The senior laboratory will accommodate 70 students at one time; a desk, equipped with compound microscope and accessories, together with glassware, reagents, etc., and supplied with electric light and gas, is provided for each student. Dissecting microscopes, microtomes and other apparatus are available for use. The graduate laboratory is similarly equipped. It will accommodate 20 students. The large and rapidly growing collections of insects are in a room adjoining both laboratories. In the library of the building is an excellent collection of the more important books and journals treating of entomology, and many more are accessible in the college library and in the private libraries of the professors, in all making available more than 25,000 volumes, many of which cannot be found elsewhere in the United States. A card catalogue giving references to the published articles on different insects contains more than 60,000 cards, and is the largest index of its kind in the United States, and probably in the world. In the basement is a pump room where may be studied the construction of the different types of spray pump, methods of repairing them; hose, couplings, nozzles and the other parts of spraying outfits are provided, not only for examination but for use. In another room, provided with chemical desks and apparatus, methods for the determination of the impurities and adulterations of insecticides are taught. As the insectary of the Massachusetts Agricultural Experiment Station is in the same building, the facilities it offers are also available. A greenhouse, where plants infested with injurious insects are under observation and experimental treatment, is also open to students. Photographic rooms with cameras and other photographic apparatus are provided, and the large greenhouses, gardens, orchards and grounds of the college offer further opportunities for the study of injurious insects under natural conditions.

FARM ADMINISTRATION. — The college farm of 190 acres is under the supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The work in this department includes the production of the common field crops, and the care and raising of the different classes of live stock mentioned under animal husbandry. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied.

FLORICULTURE. — The department of floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a department of floriculture better equipped than this. The legislative appropriation of 1908 has made possible the erection of a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of plant materials.

Forestry. — The aim of the course in forestry is to prepare men for the advanced study in forestry schools, and at the same time, by laying particular stress on local conditions, to enable them to handle the farm wood lot in the same scientific manner as the rest of the farm. The college is well situated for forestry study. There is a good forest nursery on the college grounds; also two typical farm wood lots. In the vicinity are considerable areas of typical New England forest land.

Geology. — A large, well lighted laboratory for geology, 27 by 50 feet, is in the basement of the new building for entomology, zoölogy and geology. This is equipped with cabinets, models, charts and a teaching collection of rocks. It has a seating capacity of 50 persons. Adjoining this is a smaller laboratory, 21 by 27 feet, for mineralogy, supplied with gas and cabinets for models, crystals and minerals. There is also a small laboratory for grinding thin sections and a private laboratory, 6 by 19 feet, for analysis work. The geological museum is 27 by 48 feet. It has 6 large cases for exhibition purposes.

The equipment for geology is being enlarged. At present, in addition to the general items mentioned above, it consists of a petrographic microscope, an illustrative series of thin sections, a small collection of invertebrate fossils, some casts of vertebrate fossils, a collection of the building stones of Massachusetts and a duplicate set of the Edward Hitchcock survey collection of the rocks and minerals of Massachusetts.

Heating, Lighting and Power. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop.

Landscape Gardening. — The work in landscape gardening is developed in a strong technical four-years course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for thorough work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

Library. — The library — stack room, reading room and office — occupies the entire lower floor of the library-chapel building. It contains nearly 34,000 volumes and a large number of pamphlets, hitherto inaccessible, but which are being put into good working order as fast as possible. Works of a scientific character predominate, but economics, literature and history are well represented and are receiving due attention. The reading room provides a variety of periodical literature, both technical and popular, encyclopedias and general reference books, and a select collection of works for general reading.

The library is now being reclassified and recatalogued, to make the splendid collection of material here gathered together readily accessible and of the greatest working value. Every effort is being made toward developing the library into a vital intellectual center of college life, of equal value to every student, teacher and teaching department. In consequence, only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced.

Lectures are given to regular and short course students to enable them to make the best use of the library. Emphasis is laid upon the proper use of the card catalogue, periodical indexes, bibliographies and guides; also, in general, assigned and class-room work, and essay and debate work.

The library hours are from 7.45 A.M. to 9 P.M. every week day, and from 9 A.M. to 2 P.M. on Sundays, in term time. Shorter hours prevail during vacations.

Market Gardening. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and a laboratory particularly equipped for floriculture and market gardening. A good library of works on vegetable gardening is available.

MATHEMATICS, PHYSICS AND CIVIL ENGINEERING. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 3 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 2 wye levels, a dumpy level, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

Physics. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

MILITARY SCIENCE. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

PHYSICAL EDUCATION. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The room used for exercise and recreation is equipped with modern developing apparatus and two hand-ball courts, and is large enough for basket ball. The apparatus can quickly be removed to clear the floor. An out-door board track enables students to secure track practice through the winter. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a bathroom. The gymnasium is open from 9 A.M. to 10 P.M., and exercise may be taken at such hours as do not conflict with military drill or physical education classes. The regulation costume for class exercise consists of a white track suit and white, rubber-sole shoes.

POMOLOGY. — The department of pomology has 10 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There is also a commercial vineyard and a smaller one; in these are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also extensive nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples and plums in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1909–10, for instance, apples for class use were received from British Columbia, Ontario, Quebec, Nova Scotia, Iowa, Wisconsin, Michigan, Connecticut, New York, Oklahoma, Kansas, Colorado, Oregon, New Jersey and Vermont, besides collections of grapes from California and citrous fruit from Florida and Texas.

PUBLIC SPEAKING. — In connection with the work in public speaking, three regular contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests furnish a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Inter-college contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the college Debating Club.

VETERINARY SCIENCE AND BACTERIOLOGY. — The department of veterinary science and bacteriology occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There are a lecture hall, a museum, a demonstration room, a photographing room and a work shop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in bacteriology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

ZOÖLOGY. — The college offers increased facilities for the study of zoölogy. In the new building for entomology, zoölogy and geology are spacious laboratories for both undergraduate and graduate work. On the first floor is a large sophomore laboratory, 27 by 100 feet, with a present seating capacity of 100 persons. Adjoining this is a smaller room, 20 by 27 feet, for junior and senior courses. On the second floor is a laboratory, 20 by 32 feet, for advanced work. All laboratories are equipped with gas. The equipment consists of 80 compound microscopes and accessories, 70 dissecting microscopes, microtomes and accessories, paraffine baths, incubator, dissecting instruments, glassware and other necessary apparatus. Small aquaria and vivaria will be added.

The large amphitheater lecture hall is used jointly by the departments of entomology and zoölogy-geology. It is equipped with charts and models. The zoölogical museum is drawn upon at all times for illustrative material. The zoölogical museum is 27 by 48 feet. The main room is on the first floor of the building. Above this, on a level with the second floor, is a large gallery. On the main floor are 8 large wall cases and 5 large floor cases for exhibition purposes. The gallery has 1 large wall case and 2 floor cases, with space for 10 additional cases. The zoölogical collection consists of nearly 12,000 specimens. All the chief phyla are represented. Adjoining the museum is a preparator's room for the curator. The museum is open to the public from 1 to 5 P.M. on Saturdays, and on other week days from 3 to 5 P.M. The curator is Assistant Professor Gordon.

College Activities.

Religious Services.

Chapel services are held four days a week. On Wednesday, instead of chapel an afternoon assembly is held, for which an attempt is made to secure speakers who will present important current subjects. Students are required to attend chapel and assembly.

The Young Men's Christian Association of the college holds a short religious meeting in the chapel on Thursday evenings, and conducts several Bible classes. For part of the year the college and the Young Men's Christian Association unite in Sunday vespers and in Sunday morning talks in the chapel. At vespers a prominent clergyman or layman speaks.

Student Organizations.

A large number of student organizations furnish opportunity for work and leadership to students.

The Massachusetts Agricultural College Social Union has recently been established. All students become members by paying a small fee; the Union is designed to become the center of student interests. It has equipped in North College a trophy room and a large lounging room for music, reading and study. In the basement of this building there is also a game room for pool and billiards. The Union gives, in the fall and winter months, a series of entertainments, free to the students and faculty.

The Young Men's Christian Association is active both socially and religiously.

The College Senate is composed of representatives of the senior and junior classes. It serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The musical organizations include an orchestra, a glee club, and a quartette. These furnish music for college meetings, and occasionally give concerts. A military band is maintained as part of the cadet corps.

The Athletic Association represents in the college the interests of the football, baseball, track, hockey and tennis teams.

Among the other clubs are the Rifle Club, the Mettewampe Club, organized for walking and other outdoor recreation, and a debating club. Provision is made for credit for a specified amount of work done under supervision in the Debating Club, and intercollege debates are held. The Public Speaking Council was organized in March, 1910.

The college publications are the "Signal," published weekly by the student body, and the "Index," published annually by the junior class.

Clubs, Conferences and Seminars.

The All M. A. C. Chemists is an organization of all persons interested in chemistry who have been connected with the college in the past or are now connected with it. This club, by meetings, lectures, excursions, etc., promotes instruction in practical agricultural chemistry.

The Stockbridge Club is an organization of students specially interested in practical agriculture, horticulture and floriculture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

The Language Conference, meeting about once a month, is composed of the instructors in the departments of English and Modern Languages and the students who are enrolled in elective courses in these departments.

A seminar for juniors and seniors is conducted by the division of agriculture. The division of horticulture likewise conducts conferences or seminars.

An entomological club and a zoölogical club are also maintained by those specially interested in these departments of college work.

PRIZES AWARDED FOR THE YEAR 1910.

GRINNELL PRIZES. — First prize, $25, Frank Tuttle Haynes; second prize, $15, Roger Sherman Eddy; third prize, $10, Francis Stone Beeman.

BOTANICAL PRIZES. — For the best herbarium, $15, Sumner Cushing Brooks. For the best collection of Massachusetts trees and shrubs, $10, Sumner Cushing Brooks. For the best collection of Massachusetts woods, $10, Sumner Cushing Brooks.

FORESTRY PRIZE. — For the best essay on arboriculture, $25, Edgar Morton Brown.

GENERAL IMPROVEMENT PRIZE. — Given to that member of the sophomore class who, during his first two years in college, has shown the greatest improvement in scholarship, character and example; $25, Herbert James Stack.

PRIZES IN PUBLIC SPEAKING. — In debating: Irving Craig Gilgore, 1911, $15, and gold medal; Harold Francis Willard, 1911, $15, and gold medal; Benjamin Gilbert Southwick, 1912, $15, and gold medal. In oratory: Theodore Joseph Moreau, 1912, $20, and gold medal; Louis Brandt, 1910, $15. In declamation: Horace Mitchell Baker, 1913, $15; Frederick David Griggs, 1913, $10.

MILITARY HONORS. — The following officers were reported to the Adjutant-General of the United States and to the Adjutant-General of Massachusetts for their high merit in military work: Maj. Roger Sherman Eddy, Capt. Henry Alvan Brooks, Capt. Frank Tuttle Haynes, Capt. Horace Wells French, Capt. Edward Harrison Turner, First Lieut. Lawrence S. Dickinson.

DEGREES CONFERRED AND ROLL OF STUDENTS.

DEGREES CONFERRED—1910.

MASTER OF SCIENCE.

Chapman, George Henry, Amherst, Massachusetts Agricultural College, B.Sc., 1907.

BACHELOR OF SCIENCE (B.SC.).

Allen, Rodolphus Harold,	Fall River.
Annis, Ross Evered,	Natick.
Armstrong, Robert Pierson,	Rutherford, N. J.
Bailey, Dexter Edward,[1]	Tewksbury.
Bailey, Justus Conant,	Wareham.
Beeman, Francis Stone,	West Brookfield.
Blaney, Jonathan Phillips,	Swampscott.
Brandt, Louis,	Everett.
Brooks, Henry Alvan,[1,2]	Cleveland, O.
Brooks, Sumner Cushing,[2]	Amherst.
Brown, Louis Carmel,[1]	Bridgewater.
Burke, Edward Joseph,[2]	Holyoke.
Clarke, Walter Rowe,[1]	Milton-on-Hudson, N. Y.
Cloues, William Arthur,	Warner, N. H.
Cowles, Henry Trask,[2]	Worcester.
Damon, Edward Farnham,[2]	Concord Junction.
Dickinson, Lawrence Sumner,[1]	Amherst.
Eddy, Roger Sherman,[1]	Dorchester.
Everson, John Nelson,	Hanover.
Fisk, Raymond John,	Danvers.
Folsom, Josiah Chase,[1]	Billerica.
Francis, Henry Russell,	Dennisport.
French, Horace Wells,[1]	Pawtucket, R. I.
Haynes, Frank Tuttle,[1]	Sturbridge.
Hayward, Warren Willis,	Millbury.
Hazen, Myron Smith,	Springfield.
Holland, Arthur Witt,	Shrewsbury.
Hosmer, Charles Irwin,	Turners Falls.
Johnson, William Clarence,[1]	South Framingham.
Leonard, William Edward,[2]	Belmont.
McLaine, Leonard Septimus,[1,2]	New York, N. Y.
Mendum, Samuel Weis,[2]	Roxbury.
Nickless, Fred Parker,	Billerica.
Oertel, Charles Andrew,	South Hadley Falls.
Partridge, Frank Herbert,	Cambridge.
Paulsen, George William,[1]	New York, N. Y.

---

[1] Military diploma.

[2] Boston University diploma.

Schermerhorn, Lyman Gibbs,[1]	Kingston, R. I.
Thomas, Frank Lincoln,[1]	Athol.
Turner, Edward Harrison,[1]	Reading.
Urban, Otto Velorous Taft,[1]	Upton.
Vinton, George Newton,	Sturbridge.
Waldron, Ralph Augustus,	Hyde Park.
Wallace, William Newton,[2]	Amherst.

Total, 43.

---

[1] Military diploma.

[2] Boston University diploma.

ROLL OF STUDENTS.

GRADUATE STUDENTS. — CANDIDATES FOR A DEGREE.

Anderson, David Wadsworth, B.Sc., New Hampshire State College, 1910.	Manchester, N. H.,	– –
Bartlett, Oscar Christopher, B.Sc., Massachusetts Agricultural College, 1909.	Westhampton,	– –
Bourne, Arthur Israel, A.B., Dartmouth College, 1907.	Kensington, N. H.,	– –
Holland, Edward Bertram, M.Sc., Massachusetts Agricultural College, 1892.	Amherst,	28 North Prospect Street.
McLaine, Leonard Septimus, B.Sc., Massachusetts Agricultural College, 1910.	New York, N. Y.,	– –
Merrill, Joseph Henry, B.Sc., Dartmouth College, 1905.	Danvers,	– –
Regan, William Swift, B.Sc., Massachusetts Agricultural College, 1908.	Northampton,	– –
Shaw, Jacob Kingsley, B.Sc., University of Vermont, 1899; M.S., Massachusetts Agricultural College, 1908.	Amherst,	1 Allen Street.
Smith, Philip Henry, B.Sc., Massachusetts Agricultural College, 1897.	Amherst,	102 Main Street.
Smulyan, Marcus Thomas, B.Sc., Massachusetts Agricultural College, 1909.	Amherst,	– –
Summers, John Nicholas, B.Sc., Massachusetts Agricultural College, 1907.	Campello,	– –
Thomas, Frank Lincoln, B.Sc., Massachusetts Agricultural College, 1910.	Athol,	– –
Waters, Theodore Charles, B.Sc., Massachusetts Agricultural College, 1909.	Rocky Hill, Conn.,	– –

GRADUATE STUDENTS. — NOT CANDIDATES FOR A DEGREE.

Greenfield, Melvin Leroy, A.B., Colgate, 1908.	Durhamville, N. Y.,	1 Allen Street.
Lawton, Ruth White, A.B., Vassar College, 1910.	Longmeadow,	Longmeadow.

Total, 15.

SENIOR CLASS.

Adams, James Fowler,[1]	Melrose,	11 South College.
Allen, Park West,	Westfield,	18 South College.
Baker, Herbert Jonathan,	Selbyville, Del.,	15 North College.
Barrows, Raymond Corbin,	Stafford Springs, Conn.,	5 South College.
Bentley, Arnold Gordon,[1]	Hyde Park,	4 South College.
Blaney, Herbert Wardwell,	Swampscott,	C. S. C. House.
Brown, Edgar Morton,	Merrick,	Theta Phi House.
Burnham, Arthur James,[1]	Holyoke,	75 Pleasant Street.
Bursley, Allyn Parker,	West Barnstable,	Theta Phi House.
Conant, Arthur Theodore,	Sunderland,	7 North College.
Damon, Charles Murray,[1]	Haydenville,	20 South College.
Davis, Egbert Norton,	South Framingham,	7 North College.
Davis, Irving Wilder,	Lowell,	Insectary, M. A. C.
Drury, Harold Blake,	Athol,	6 North College.

---

[1] Work incomplete.

Dudley, John Edward, Jr.,[1]	Newton Center,	11 North College.
Gilgore, Irving Craig,	Central Square, N. Y.,	4 South College.
Hill, Nathaniel Herbert,[1]	Princeton, N. J.,	17 South College.
Howe, Harold Hosmer,[1]	Springfield,	Wilder Hall, M. A. C.
Jenks, Albert Roscoe,[1]	Three Rivers,	Plant House, M. A. C.
Johnson, Leonard Matthews,[1]	Easthampton,	6 South College.
Labouteley, Gaston E.,	Lynn,	Plant House, M. A. C.
Larrabee, Edward Arthur,	Winthrop,	Clark Hall, M. A. C.
Lull, Robert Delano,	Windsor, Vt.,	9 Fearing Street.
McGraw, Frank Dobson,[1]	Fall River,	C. S. C. House.
McLaughlin, Frederick Adams,	Lee,	15 North College.
Morse, Henry Bowditch,[1]	Salem,	75 Pleasant Street.
Nagai, Isaburo,	Tokyo, Japan,	10 North College.
Nickerson, George Payne,	Amherst,	17 South College.
Nielsen, Gustaf Arnold,[1]	West Newton,	C. S. C. House.
Ostrolenk, Bernhard,	Gloversville, N. Y.,	12 North College.
Parsons, Samuel Raynolds,	North Amherst,	North Amherst.
Patch, Roland Harrison,	Wenham,	4 North College.
Pauly, Herman Alfred,	Plainfield, Vt.,	14 North College.
Pickard, Percy William,	Hopedale,	5 South College.
Piper, Ralph Waldo,	South Acton,	12 South College.
Prouty, Frank Alvin,[1]	Worcester,	9 South College.
Prouty, Philip Herman,	Shrewsbury,	West Experiment Station.
Racicot, Philias Armand,	Lowell,	16 South College.
Robinson, Ralph Cushing,	Boston,	9 South College.
Sharpe, Arthur Harris,[1]	Saxonville,	2 South College.
Smith, Clarence Albert,	Northampton,	12 South College.
Smith, Raymond Goodale,[1]	Lynn,	3 Fearing Street.
Stevenson, Lomas Oswald,	Hackensack, N. J.,	87 Pleasant Street.
Warren, Edward Irving,[1]	Leicester,	16 South College.
Whitney, Raymond Lee,	Brockton,	6 Maple Avenue.
Willard, Harold F.,	Leominster,	18 South College.
Winn, Ervin Lawrence,	Holden,	87 Pleasant Street.

Total, 47.

JUNIOR CLASS.

Ackerman, Arthur John,[1]	Worcester,	7 South College.
Beals, Carlos Loring,	Sunderland,	Chemical Laboratory.
Beers, Rowland Trowbridge,[1]	Billerica,	20 South College.
Bent, William Richard,	Marlborough,	2 North College.
Bodfish, Edward Hill,	West Barnstable,	6 Phillips Street.
Boland, Eric Nichols,	South Boston,	13 Fearing Street.
Brett, Alden Chase,[1]	North Abington,	2 South College.
Brown, Merle Raymond,	Greenwich Village,	92 Main Street.
Burr, Frederick Huntington,[1]	Worthington,	16 North College.
Caldwell, Lawrence Sanborn,[1]	Lynnfield Center,	5 North College.
Carpenter, Jesse, Jr.,[1]	Attleborough,	9 North College.
Castle, Fred Arlo,	Kansas City, Mo.,	13 South College.
Clapp, Raymond Kingsley,	Westhampton,	16 North College.
Curran, Daniel Joseph,	Marlborough,	Lover's Lane.
Dee, John Francis,	Worcester,	Lincoln Avenue, at Mrs. Spear's.
Deming, Winfred Griswold,	Wethersfield, Conn.,	15 Fearing Street.
Dodge, Albert Wesley,	Wenham,	13 North College.
Eisenhaure, John Louis,[1]	North Reading,	– –
Ells, Gordon Waterman,[1]	Haverhill,	Walker's House.
Fagerstrom, Leon Emanuel,[1]	Worcester,	1 North College.
Fisherdick, Warren Francis,	Amherst,	26 South Pleasant Street.
Fitts, Frank Orus,[1]	North Amherst,	R. J. Goldberg's.
Fitzgerald, John Joseph,	Holyoke,	33 Elm Street, Holyoke.
Fowler, George Scott,[1]	Wayland,	44 Pleasant Street.
Frost, John Newton,[1]	Natick,	77 Pleasant Street.

---

[1] Work incomplete.

Gallagher, James Andrew,	North Wilmington,	25 Lincoln Avenue.
Gaskill, Lewis Warren,	Hopedale,	Experiment Station.
Gelinas, Louis Edmond,[1]	North Adams,	14 North College.
Gibbs, Robert Morey,	Chester,	Walker Hall.
Gibson, Lester Earl,[1]	Melrose,	6 Maple Avenue.
Gray, Frank Leonard,	East Boston,	21 Fearing Street.
Hallowell, Royal Norton,	Jamaica Plain,	Mathematical Building.
Hamblin, Stephen Francis,	Marston Mills,	44 Triangle Street.
Hammond, Arthur Augustus,[1]	Wallingford, Conn.,	Phi Gamma Delta House.
Harlow, Joseph Alvin,	Turners Falls,	5 North College.
Heald, Jay Morrill,	Watertown,	2 North College.
Hemenway, Thomas,	Winchester,	West Experiment Station.
Hickey, Francis Benedict,	Brockton,	C. S. C. House.
Hills, Frank Burrows,	Bernardston,	8 South College.
Holland, Henry Lucius,	Amherst,	28 North Prospect Street.
Hutchings, Herbert Colby,[1]	South Amherst,	13 North College.
Kingsbury, Arthur French,	Medfield,	Chemical Laboratory.
Lamson, Robert Ward,	Amherst,	51 Pleasant Street.
Lin, Dau Yang,	Shanghai, China,	21 Fearing Street.
Lodge, Charles Albert,[1]	Manchester,	85 Pleasant Street.
Lloyd, Edward Russell,[1]	Boston,	25 Lincoln Avenue.
Madison, Francis Spink,	East Greenwich, R. I.,	Veterinary Laboratory.
Martin, James Francis,	Amherst,	19 South East Street.
McGarr, Thomas Anthony,[1]	Worcester,	3 North College.
Merkle, George Edward,[1]	Amherst,	East Street.
Merrill, Fred Sawyer,	Danvers,	85 Pleasant Street.
Moreau, Theodore Joseph,	Turners Falls,	10 South College.
Müller, Alfred Frederick,[1]	Jamaica Plain,	3 North College.
Noyes, Harry Alfred,	Marlborough,	Chemical Laboratory.
O'Flynn, George Bernhard,[1]	Worcester,	75 Pleasant Street.
Parker, Ralph Robinson,	Malden,	C. S. C. House.
Pearson, Charles Cornish,	Arlington,	14 South College.
Peckham, Curtis,	Clifford,	C. S. C. House.
Philbrick, William Edwin,	Taunton,	14 South College.
Pierpont, John Edward,	Williamsburg,	C. S. C. House.
Pratt, Marshall Cotting,	Holderness, N. H.,	Kappa Sigma House.
Puffer, Stephen Perry,	North Amherst,	North Amherst.
Raymond, Arthur Nathaniel,	Leominster,	79 Pleasant Street.
Reed, Robert Edward,[1]	Abington,	Theta Phi House.
Robinson, Earle Johnson,[1]	Hingham,	8 South College.
Rockwood, Lawrence Peck,	Waterbury, Conn.,	116 Pleasant Street.
Sanctuary, William Crocker,	Amherst,	Mill Valley.
Sellew, Lewis Raymond,	Natick,	Brooks Farm.
Shaw, Ezra Ingram,	Amherst,	8 Spaulding Street.
Southwick, Benjamin Gilbert,	Buckland,	8 North College.
Stack, Herbert James,	Conway,	Plant House.
Terry, Leon,	Springfield,	8 Walnut Street.
Torrey, Ray Ethan,	North Leverett,	East Pleasant Street.
Tower, Daniel Gordon,	Roxbury,	15 South College.
Tupper, George Wilbur,[1]	Jamaica Plain,	85 Pleasant Street.
Turner, Howard Archibald,	Dorchester,	Plant House.
Wales, Robert Webster,	North Abington,	Kappa Sigma House.
Walker, Herman Chester,[1]	Marlborough,	Walker Hall.
Warner, Roger Andrew,[1]	Sunderland,	4 North College.
Weaver, William Jack,	Alandar,	10 Allen Street.
Whitney, Charles Everett,	Wakefield,	Walker's Hall.
Wilbur, Emory Sherman,	East Wareham,	Plant House.
Wilde, Earle Irving,	Taunton,	9 North College.
Williams, Edward Roger,[1]	Concord,	1 North College.
Williams, Silas,	Fall River,	Theta Phi House.
Wood, Howard Holmes,[1]	Shelburne Falls,	15 South College.
Young, Edwin Burnham,[1]	Dorchester,	8 North College.

Total, 87.

---

[1] Work incomplete.

SOPHOMORE CLASS.

Adams, Winford Frederic,[1]	East Leverett,	2 Allen Street.
Allen, Harry Willis,	Amherst,	Amherst.
Anderson, Oscar Gustaf,	East Pepperell,	Entomological Laboratory.
Angier, Harris William,	Westborough,	88 Pleasant Street.
Baird, Harry Albert,[1]	Somerville,	Bungalow, Lover's Lane.
Baker, Dean Foster,	New Bedford,	Walker Hall.
Baker, Horace Mitchell,	Selbyville, Del.,	Kappa Sigma House.
Barber, George Ware,	Franklin,	120 Pleasant Street.
Barstow, Harold Dunbar,[1]	Hadley,	84 Pleasant Street.
Birdsall, Webster Jennings,[1]	Otego, N. Y.,	6 Maple Avenue.
Blake, Ralph Cedric,[1]	Wollaston,	President's House, M. A. C.
Borden, Ralph James,	Fall River,	Phillips Street.
Bradley, John Watling,[1]	Groton,	Theta Phi House.
Brewer, Charlesworth Herbert,[1]	Mt. Vernon, N. Y.,	85 Pleasant Street.
Brown, Herbert Augustine,	Saxonville,	79 Pleasant Street.
Bullard, Alvan Henry,	South Framingham,	5 McCellan Street.
Burby, Lawrence Walter,[1]	Chicopee Falls,	Theta Phi House.
Bursley, Harold Barrows,	Peabody,	Theta Phi House.
Caldwell, David Story,	South Byfield,	Brooks Farm.
Carver, John Stuart,	Roslindale,	85 Pleasant Street.
Chun, Woon Young,[1]	Shanghai, China,	90 Pleasant Street.
Clark, Norman Russell,	Worcester,	College Store.
Clegg, Frank Jackson,	Fall River,	C. S. C. House.
Cobb, Joseph Boyd,[1]	Chicopee Falls,	84 Pleasant Street.
Cole, Arlin Tower,[1]	West Chesterfield,	44 Triangle Street.
Cole, Flora Atwood,	Watertown,	Draper Hall.
Coleman, Isaac,[1]	Amherst,	12 North College.
Cooper, Everett Hanson,	Greenwood,	Walker Hall.
Cory, Harold,	Rutherford, N. J.,	82 Pleasant Street.
Covill, Joseph Warren,[1]	West Roxbury,	7 South College.
Cristman, Clyde Edward,	Dalton,	44 Triangle Street.
Curtis, Harold William,	Belchertown,	Belchertown.
Dayton, James Wilson,	South Norwalk, Conn.,	25 College Street.
Dooley, Thomas Patrick,	South Boston,	35 East Pleasant Street.
Drury, Lewis Floyd,	Rutland,	120 Pleasant Street.
Edminster, Albert Franklin,	Brooklyn, N. Y.,	Mount Pleasant.
Ellis, Benjamin Ward,	Plymouth,	Clark Hall.
Fay, Robert Sedgwick,	Monson,	84 Pleasant Street.
Forbush, Wallace Clifford,	Rutland,	R. J. Goldberg's.
French, James Dudley,	Hyde Park,	116 Pleasant Street.
Gaskill, Ralph Hicks,	Amherst,	15 Hallock Street.
Godvin, Thomas Joseph,[1]	Jamaica Plain,	75 Pleasant Street.
Goodnough, Henry Edward,[1]	Wilbraham,	Kappa Sigma House.
Gore, Harold Martin,	Wollaston,	11 South College.
Greenleaf, George Freeman,[1]	Brockton,	21 Fearing Street.
Griffin, William Gerald,	South Hadley Falls,	35 East Pleasant Street.
Griggs, Frederick David,	Chicopee Falls,	84 Pleasant Street.
Guild, Louis Franklin,[1]	Swanton, Vt.,	Thompson House.
Harris, Burton Adams,[1]	Wethersfield, Conn.,	66 Pleasant Street.
Hasey, Willard Harrison,	Brockton,	C. S. C. House.
Hatch, Herbert Tilden,	Norwell,	East Experiment Station.
Hayden, William Vassall,[1]	Beverly,	Walker Hall.
Headle, Herbert Wallace,	Bolton,	Mrs. L. H. Taylor's.
Headle, Marshall,	Bolton,	Mr. Lewis Howard's.
Holden, James Loomis,	Palmer,	5 McCellan Street.
Howe, Glover Elbridge,	Marlborough,	11 North College.
Howe, Ralph Wesley,	East Dover, Vt.,	116 Pleasant Street.
Hubert, Benjamin Franklin,	White Plains, Ga.,	48 Mount Pleasant Street.
Huntington, Samuel Percy,	Lynn,	Kappa Sigma House.

---

[1] Work incomplete.

Hutchison, Robert B.,[1]	Somerville,	11 Phillips Street.
Hyland, Harold Wilson,[1]	Weymouth,	Kappa Sigma House.
Jenney, Herbert Hedge,	South Boston,	116 Pleasant Street.
Jones, Harold Frederick,	Campello,	120 Pleasant Street.
Jordan, Simon Miller,	Rutherford, N. J.,	Walker's House.
Kelley, Albert Joseph,	Roxbury,	75 Pleasant Street.
Kelley, Bernard Jenkins,	Harwich,	116 Pleasant Street.
Kenney, Frederick Alfred,	Charlestown,	77 Pleasant Street.
Lake, James Edward,	Fall River,	5 McCellan Street.
Lane, William Francis,	Leominster,	Phillips Street.
Larsen, Nils Paul,	Bridgeport, Conn.,	Clark Hall.
Lesure, John Warren Thos.,	Lunenburg,	94 Pleasant Street.
Little, Willard Stone,	Newburyport,	120 Pleasant Street.
Lowry, Quincy Shaw,[1]	Canton,	Kappa Sigma House.
Lyon, Harold,	Somerville,	116 Pleasant Street.
Macone, Joseph Augustine,[1]	Concord,	116 Pleasant Street.
Mallett, George Alfred,	Bridgeport, Conn.,	Walker Hall.
Marsh, Frank Eugene,[1]	Jefferson,	Experiment Station Barn.
Matz, Julius,[1]	Boston,	112 Pleasant Street.
Mayer, John Lawrence,	South Boston,	35 East Pleasant Street.
McDougall, Allister Francis,	Westford,	Brooks Farm.
Moir, William Stuart,	Boston,	35 North Prospect Street.
Murray, Joseph Wilbur,	Holyoke,	75 Pleasant Street.
Neal, Ralph Thomas,	Mattapan,	120 Pleasant Street.
Nichols, Norman Joseph,	Everett,	Mrs. L. H. Taylor's.
O'Brien, James Leo,	Wayland,	The Bungalow, Lover's Lane.
Packard, Clyde Monroe,	Springfield,	96 Pleasant Street.
Parsons, Robert,	Lynn,	44 Triangle Street.
Pease, Lester Newton,	Meriden, Conn.,	84 Pleasant Street.
Pellett, John Doubleday,[1]	Worcester,	20 North College.
Pillsbury, Joseph James,[1]	West Bridgewater,	8 South Prospect Street.
Post, George Atwell,[1]	Richmond Hill, N. Y.,	Theta Phi House.
Prouty, Roy Henry,[1]	Worcester,	Walsh's House.
Putnam, Earl Francis,[1]	Easthampton,	5 McCellan Street.
Roberts, Clarence Dwight,[1]	New Haven, Conn.,	10 Allen Street.
Roehrs, Herman Theodore,	New York, N. Y.,	83 Pleasant Street.
Rosebrooks, Walter Edwin,	Millbury,	Care of Mrs. Tripp, East Pleasant Street.
Samson, Stuart Dodge,	Grand Isle, Vt.,	Kappa Sigma House.
Selden, John Lincoln,[1]	Northampton,	3 McCellan Street.
Serex, Paul, Jr.,	Jamaica Plain,	75 Pleasant Street.
Sheehan, Dennis Anthony,	South Lincoln,	Walker Hall.
Shute, Carl August,[1]	Hampden,	120 Pleasant Street.
Streeter, Charles Marsh,	Brimfield,	R. J. Goldberg's.
Thayer, Clark Leonard,	Enfield,	77 Pleasant Street.
Tucker, Waldo Guy,	Lynn,	19 Pleasant Street.
Tupper, Arthur Somerville,	Roxbury,	85 Pleasant Street.
Van Zwaluwenburg, Reyer Herman,	Rutherford, N. J.,	East Experiment Station.
Walker, Charles Dexter,[1]	Greenwich Village,	120 Pleasant Street.
Wells, Nathan Holmes,[1]	Kennebunk, Me.,	Care of Mrs. E. W. Smith, North Prospect Street.
Whitney, Francis Wellington,	Needham,	15 Hallock Street.
Zabriskie, George, 2d,	Rutherford, N. J.,	Pleasant Street.

Total, 110.

Freshman Class.

Abbott, Leslie Elmer,	Sandwich,	Brooks Farm.
Allbee, Gerard Osias,	Medway,	Mount Pleasant, care of Ora Samuel Gray.
Allen, Carl Murdough,	Holyoke,	3 Fearing Street.
Anapolsky, Morris,	Boston,	8 Walnut Street.

---

[1] Work incomplete.

Anderson, Leslie Oscar,	Concord,	55 Pleasant Street.
Baker, Melville,	West Medford,	Campion's, Pleasant Street.
Besser, Sidney Stokes,	Gilbertville,	Brooks Farm.
Bickford, Horace Mann,	East Braintree,	116 Pleasant Street.
Bittinger, Fritz John,	Plymouth,	120 Pleasant Street.
Blackhall, Allan John,	Brookline,	17 Fearing Street.
Bokelund, Chester,	Worcester,	31 East Pleasant Street.
Bragg, Ralph Stanley,	Milford,	Mount Pleasant.
Brewer, Harold William,	Mount Vernon, N. Y.,	Care of Mrs. Dyer, Phillips Street.
Brooks, Arthur Winslow,	New Bedford,	Brooks Farm.
Brown, Harry Dunlap,	Lowell,	82 Pleasant Street.
Caldwell, Delmont Leo,	Dorchester,	6 Nutting Avenue.
Calvert, Melville Bradford,	New London, Conn.,	58 Pleasant Street.
Chapon, Robert Henri,	Bangor, Me.,	83 Pleasant Street.
Christie, Edward Wheeler,	North Adams,	29 Lincoln Avenue.
Clark, Ernest Samuel, Jr.,	Tolland,	96 Pleasant Street.
Clay, Harold Johnson,	Cambridge,	21 Fearing Street.
Coe, Alfred Lynn,	New York, N. Y.,	Mrs. L. H. Taylor's, North Amherst.
Cole, Herbert Elmer,	Three Rivers,	120 Pleasant Street.
Coleman, David Augustus,	South Framingham,	29 McCellan Street.
Culley, Frank Hamilton,	Marshalltown, Ia.,	30 North Prospect Street.
Damon, Samuel Reed,	Kingston, R. I.,	77 Pleasant Street.
Davies, Lloyd Garrison,	Peabody,	3 McCellan Street.
Davis, Ralph Edward,	Southbury, Conn.,	77 Pleasant Street.
Davis, William Ashmun,	Sunderland,	Care of E. H. Forristall.
Dearing, Newton Howard,	Brookline,	11 Cottage Street.
Demond, Robert Norton,	Stafford Springs, Conn.,	Care of E. H. Forristall.
Dexter, Evans King,	Mattapoisett,	31 East Pleasant Street.
Dunbar, Erving Walker,	North Weymouth,	5 Sunset Avenue.
Dunne, Robert Ernest,	New York, N. Y.,	17 Kellogg Avenue.
Earle, Henry Weston,	Roxbury,	108 Pleasant Street.
Edgerton, Almon Morley,	West Springfield,	Nutting Avenue.
Edmonds, Sidney Wilfred,	Roslindale,	60 Pleasant Street.
Edwards, Edward Clinton,	Salem,	15 Cottage Street.
Elder, William Arthur,	Irvington, N. Y.,	56 Pleasant Street.
Eldridge, Harold Lockwood,	Wareham,	M. A. C. Grounds.
Farrar, Stuart Kittredge,	Springfield,	35 East Pleasant Street.
Foster, Stuart Brooks,	West Somerville,	16 Pleasant Street.
Freeborn, Stanley Barron,	Marlborough,	116 Pleasant Street.
Freedman, Samuel Leavitt,	Roxbury,	13 East Pleasant Street.
Frost, Robert Theodore,	New York, N. Y.,	Care of Mrs. Dyer, Phillips Street.
Frye, Carl Raymond,	South Hadley Falls,	East Pleasant Street.
Gare, Edward John,	Northampton,	101 Pleasant Street.
Gibson, David Wyman,	Groton,	Care of Mrs. L. H. Taylor's, North Amherst.
Graves, Benjamin Robert,	Northampton,	58 Pleasant Street.
Grebin, Mark Anthony,	North Hadley,	North Hadley.
Hadfield, Harold Frederick,	North Adams,	29 Lincoln Avenue.
Handy, Ralph Ellis,	Cataumet,	Brooks Farm.
Harriman, Vincent Spaulding,	Brockton,	19 Hallock Street.
Harris, Rodney Wells,	Wethersfield, Conn.,	66 Pleasant Street.
Haskell, Willard Anderson,	Greenfield,	Pleasant Street.
Hazen, Edward Leonard,	Springfield,	Care of E. H. Forristall.
Hebard, Emory Blodgett,	Southbridge,	3 Fearing streets.
Heffron, Fred,	Sherborn,	47 Pleasant Street.
Higgins, Edward William,	Arlington,	79 Pleasant Street.
Hogg, Lawrence Jagger,	Lawrence,	9 Phillips Street.
Howard, Louis Phillips,	North Easton,	82 Pleasant Street.
Hutchinson, John Gouvernour,	Arlington,	79 Pleasant Street.
Hutchinson, Raymond Ernest,	South Hanson,	52 Pleasant Street.

Ingham, Earl Morris,	Granby,	6 Nutting Avenue.
Jacobs, Loring Humphrey,	Wellesley,	9 Fearing Street.
Jewett, Henry Dana,	West Newton,	Pleasant and Fearing Streets.
Johnson, Bernhard Pol,	Boston,	Walker's House.
Johnson, Rollin Eugene,	Templeton,	14 Kellogg Avenue.
Jones, Dettmar Wentworth,	Melrose,	Care of Mrs. Dyer, Phillips Street.
Keyes, Pearl Pease,	North Amherst,	North Amherst.
Kilbourn, Walter Goss,	South Lancaster,	82 Pleasant Street.
Kriebel, Addison Reiff,	Norristown, Pa.,	Thompson House.
Leach, Benjamin Robert,	Methuen,	79 Pleasant Street.
Leete, Richard Fowler,	Mount Kisco, N. Y.,	79 Pleasant Street.
Lemoine, Albert Zepherin,	South Framingham,	– –
Levine, Henry Walter,	Roxbury,	13 East Pleasant Street.
Lewis, John Kirby,	New Haven, Conn.,	58 Pleasant Street.
Lincoln, Murray Danforth,	North Raynham,	82 Pleasant Street.
Lucas, Hoyt Dennis,	West Springfield,	6 Nutting Avenue.
MacDonald, Daniel Alfred,	Walpole,	79 Pleasant Street.
MacHale, William Edward,	Jamaica Plain,	– –
Mahan, Harold Butteworth,	Hingham,	3 McCellan Street.
Major, Joseph,	Rutherford, N. J.,	58 Pleasant Street.
McNiff, Owen Augustine,	Harvard,	52 Pleasant Street.
Melloon, Ralph Reid,	Lowell,	Mount Pleasant.
Merkle, Frederick Grover,	Amherst,	East Street.
Morrison, Harold Ivory,	Melrose,	66 Pleasant Street.
Morse, Harold John,	Townsend,	Brooks Farm.
Munroe, Donald Mitchell,	Huntington, N. Y.,	101 Pleasant Street.
Murray, John Kane,	Winthrop,	14 Kellogg Avenue.
Needham, Lester Ward,	Springfield,	Care of E. H. Forristall.
Nicolet, Tell William,	Fall River,	17 Fearing Street.
Nicolet, Theodore Arthur,	Fall River,	17 Fearing Street.
Nicoll, William,	Glen Cove, N. Y.,	101 Pleasant Street.
Nissen, Harry,	Roslindale,	13 Fearing Street.
Norton, Leslie Howard,	Brockton,	19 Hallock Street.
Oertel, John Thomas,	South Hadley Falls,	Walker Hall.
Palmer, John Philip,	Portsmouth, N. H.,	79 Pleasant Street.
Parker, Edwin Kenney,	Northampton,	5 McCellan Street.
Parker, Ervine Franklin,	Poquonock, Conn.,	96 Pleasant Street.
Payne, Roland Alfred,	Wakefield,	North Amherst.
Peters, Chester Harry,	Brown Station, N. Y.,	11 Cottage Street.
Petersen, Peverill Oscar,	Concord,	55 Pleasant Street.
Pigott, Edgar Royston,	Winthrop,	14 Kellogg Avenue.
Porter, Bennett Allen,	Amherst,	R. D. 1, No. 25, Amherst.
Powers, Richard Henry,	Malden,	Walker Hall.
Presley, Fred Young,	Malden,	Pleasant Street.
Priest, Roger Alexander,	Littleton,	15 Fearing Street.
Read, Frederick William,	Boston,	75 Pleasant Street.
Rees, Harry Launcelot,	Monson,	3 Fearing Street.
Reid, George Alexander,	Worcester,	58 Pleasant Street.
Robinson, Herbert Calvin,	Haverhill,	Walker Hall.
Russell, Alden Hesseltine,	Watertown,	16 Pleasant Street.
Sahr, Gabriel Arthur,	Boston,	30 North Prospect Street.
Sanford, Clarence Higgins,	Allston,	3 Fearing Street.
Sexton, George Patrick,	Allston,	Brooks Farm.
Shaylor, Fred Wright,	Lee,	120 Pleasant Street.
Sherman, Joel Powers,	Hyannis,	Walker Hall.
Sherman, Milton Francis,	South Lincoln,	17 Kellogg Avenue.
Shirley, John Newton,	South Duxbury,	30 North Prospect Street.
Simmons, George Walker,	Boston,	116 Pleasant Street.
Slein, Owen Francis,	New Braintree,	Brooks Farm.
Small, Francis Willard,	North Truro,	12 Hallock Street.
Smart, Herbert Leighton,	Framingham,	15 Hallock Street.
Smith, Leone Ernest,	Leominster,	44 Pleasant Street.
Smith, Leon Edgar,	Brighton,	13 Fearing Street.

Spencer, Ray Silsby,	West Burke, Vt.,	79 Pleasant Street.
Stevens, Arthur Eben,	Brockton,	109 Main Street.
Stewart, George Osborn,	Somerville,	79 Pleasant Street.
Strange, Sarah Josephine,	Marshfield,	Draper Hall.
Taft, Carl Mather,	Mendon,	15 Hallock Street.
Taft, Richard Craig,	Oxford,	75 North Pleasant Street.
Talbot, Rolfe Henry,	Brockton,	5 McCellan Street.
Tarbell, Munroe Gifford,	Brimfield,	R, J. Goldberg's.
Taylor, Arthur Wright,	Feeding Hills,	Nutting Avenue.
Taylor, Leland Hart,	Peabody,	3 McCellan Street.
Thurston, Arthur Searle,	Everett,	9 Fearing Street.
Tower, Alfred Leigh,	Sheffield,	North Pleasant Street.
Tsang, Oong Hyuen,	Shanghai, China,	26 Lincoln Avenue.
Upton, Ernest Franklin,	Salem,	15 Cottage Street.
Walker, Nathaniel Kennard,	Malden,	83 North Pleasant Street.
Walker, Raymond Philip,	Taunton,	120 Pleasant Street.
Ward, Talbot,	Hyde Park,	11 Cottage Street.
Warner, Raymond Winslow,	Sunderland,	Care of E. H. Forristall.
Webster, Louis Armstrong,	Blackstone,	15 Hallock Street.
Weigel, Arthur George,	Lawrence,	79 Pleasant Street.
Wheeler, Chester Eaton,	Lowell,	79 Pleasant Street.
Wheeler, Warren Gage,	Dedham,	56 Pleasant Street.
Whidden, Burton Clark,	Waltham,	79 Pleasant Street.
Whippen, Charles Warren,	Lynn,	79 Pleasant Street.
White, Samuel Alexander,	Boston,	19 Fearing Street.
Whorf, Paul Francis,	Dorchester,	Brooks Farm.
Williams, George Edmund,	Belchertown,	Belchertown.
Wing, John Govan,	Somerville,	Brooks Farm.
Wood, Henry Joseph,	Mendon,	15 Hallock Street.
Wooley, Harold Curtis,	Malden,	83 Pleasant Street.
Wright, Frank Vernon,	Salem,	79 Pleasant Street.
Young, Royal Bosworth, Jr.,	Roxbury,	108 Pleasant Street.

Total, 160.

UNCLASSIFIED STUDENTS. — NOT CANDIDATES FOR A DEGREE.

Churchill, George Clarence,	Worcester,	15 Beston Street.
Critchett, Edward Russell,	Watertown,	Mount Pleasant.
DeMott, Henry Vroom,	Metuchen, N. J.,	2 Allen Street.
Eager, Samuel Warner,	Deerfield,	120 Pleasant Street.
Edwards, Charles Richmond,	Northampton,	– –
Gilmore, Howard Pool,	Waban,	3 Allen Street.
Granger, Helen,	Amherst,	Draper Hall.
Greene, William Allan,	Elmwood,	Mount Pleasant.
Hall, Horace Whitney,	Newton Center,	Pleasant Street.
Leonard, Larnie,	Talladega, Ala.,	48 Pleasant Street.
Lynch, Frank John,	Holyoke,	75 Pleasant Street.
O'Brien, Daniel William,	Wayland,	Lover's Lane.
Phelps, Benjamin Austin, Jr.,	Northampton,	79 Pleasant Street.
Reed, Waldo Burt,	Springfield,	11 Beston Street.
Selkregg, Edwin Reimund,	North East, Pa.,	17 Fearing Street.
Sibley, Milton Lawrence,	Worcester,	– –
Sohier, Fred Martin,	Concord,	26 McCellan Street.

Total, 17.

SUMMARY BY CLASSES.

Graduate students,		15
Senior class,	47	
Junior class,	87	
Sophomore class,	110	
Freshman class,	158	
Unclassified,	17	
		419
		434

GEOGRAPHICAL SUMMARY.

Massachusetts,	367
Connecticut,	17
New York,	18
New Jersey,	7
Rhode Island,	2
Maine,	2
New Hampshire,	3
Vermont,	6
Delaware,	2
Pennsylvania,	2
Georgia,	2
Alabama,	1
Iowa,	1
Missouri,	1
China,	3
Japan,	1
	434

SHORT COURSES.

SHORT COURSES — 1910.

WINTER COURSE STUDENTS.

Alcock, James Richard, North Amherst.
Baggs, Milton Charles, Belchertown.
Bahsler, Eugene, Dunstable.
Barnes, Joseph C., Lanesborough.
Belknap, Robert Sidney, Amherst.
Bowditch, John P., Framingham.
Bowser, Lydia Animia, Cohasset.
Bradstreet, Albert C., Topsfield.
Canlett, Thomas Griffith, Rockport.
Clark, Emerson Leland, Milford, Conn.
Channing, Hayden, Sherborn.
Childs, Samuel Wellington, Deerfield.
Cordes, Edward, Great Barrington.
Cox, Harold Childs, Wakefield.
Curtis, Elliot D., Bantam, Conn.
Day, Harry Ney, West Stockbridge.
Dow, Aaron William, Bolton.
Dunn, Howard Waterman, Dorchester.
Eastwood, John Robert, North Adams.
Edmands, Thomas Roland, Newton.
Gage, Earl Lyman, Gilbertville, N. Y.
Gray, George Arthur, Beverly.
Harris, George Browning, North Adams.
Holcomb, Edmund Alfred, Simsbury, Conn.
Hurd, Robert Otis, Westminster.
Kenney, Ralph Hewes, Greenwich, N. Y.
Ketchen, Harold Barnett, Belchertown.
Killam, John, East Boxford.
Koch, Mrs., Mabel Tyler, Bloomfield, Conn.
Lanier, Sidney, Walpole.
Lemoine, Arthur Alfred, South Framingham.
Lewis, Albert, East Rockaway, N. Y.
Marsh, Howard Clifton, Arlington.
Maurer, Frank Julius, Newton.
McCarroll, Edward Loomis, Waban.
McIntyre, George Henderson, Easthampton.
O'Donnell, James Curran, Belchertown.
Pardee, Edwin Curtis, Bolton.
Pease, Willard Morris, Monson.
Peck, Harold Frederick, Belchertown.
Perham, John Franklin, Ludlow Center.
Priest, Frederick Stimpson, Watertown.
Puffer, Willis Reynolds, Concord.
Sabine, George Kraus, Jr., Brookline.
Sanderson, Leon Benjamin, Williamsburg.
Scace, William, Pittsfield.
Scott, Edwin Gould, Garfield, Wash.
Searle, Edward, Southampton.
Seaver, John Dwight, New Britain, Conn.
Selkregg, Edwin Reimund, North East, Pa.
Shaughnessy, Thomas Francis, Marlborough.
Smith, John Anderson, South Westport.
Smith, Ralph Gibbs, North Amherst.
Supple, Mark Wellman, South Deerfield.
Thompson, Paul Ellis, Brookline.
Torrey, Lewis Edwin, Southbridge.
Urann, Carl B., Sullivan, Me.
Valentine, Francis Wadsworth, Boston.
Valentine, Richard Kirk, Erie, Pa.
Vetter, Rudolf, North Andover.
Walker, Elbert Lionel, Savoy Center.
Walker, Rena Lillis, Savoy Center.
Warfield, Preston George, Buckland.
Wheeler, George Oscar, Hudson.
Young, Earl Leonard, South Hadley.

Total, 65.

POULTRY KEEPERS' COURSE.

Barnes, Joseph C., Lanesborough.
Barnes, J. Edward, Athol.
Bradley, Miss A. J., Boston.
Chapin, E. C., Holyoke.
Chase, L. B., Sunderland.
Childs, Irving H., Deerfield.
Childs, Prentis B., Waltham.
Clement, Ralph, Richmond.
Coulson, S., Cambridge.
Crisand, Carl, Worcester.
Day, H. I., West Stockbridge.
Day, Irving N., South Hadley.
Dearden, James, Massachusetts.
Dixon, Enslo S., Roxbury.
Follett, Mrs. E. F., Boston.
Fox, Harry M., Dracut.
Heard, J. G., Dover.
Hitchcock, C. N., Amherst.
Holcomb, E. A., Simsbury, Conn.
Howards, Mrs. H. J., New York, N. Y.
Hutchinson, Wm. F., Sutton.
Johnson, C. W., Southborough.
Kendall, Mrs. H. I., Hadley.
Ketchen, Harold B., Belchertown.

Lanier, Sidney, Walpole.
Lawrence, Susan M., East Northfield.
Lupien, Israel A., Barre.
Martin, Henry L., Marblehead.
Mendum, S. W., Amherst.
Merrian, Etta L., East Northfield.
Merrick, Dr. Sara N., Cambridge.
Newton, Ward H., Athol.
Osgood, Champion, Cohasset.
Paine, Ralph D., Ludlow.
Perry, Lawrence, Hingham.
Terry, Leon, Springfield.
Priest, Frederick, Watertown.
Robinson, G. F., Somerville.
Sanderson, Leon B., Williamsburg.
Sias, Arthur E., East Boston.
Snell, Lewis P., Greenwich, N. Y.
Soderborn, G. O., New Bedford.
Stearns, John Warren, Sharon.
Thomas, Alfred C., Lawrence.
Tower, Eva L., Northfield.
Vetter, Rudolf, North Andover.
Walker, Elbert L., Savoy Center.
Whaley, James Sidney, East Orange, N. J.
Whitcomb, R. H., Amherst.
Whitney, J. C., Newbury.
Young, Earl L., South Hadley.

Total, 51.

BEEKEEPERS' COURSE.

Allen, G. H., Amherst.
Browning, C. P., Orange.
Burnett, Mrs. Harriet C., Natick.
Chapin, Annie M., Melrose.
Fleury, Joseph, Huntington.
Gowans, Ethel, Hampton, Va.
Graves, Charles, Haydenville.
Heath, Mrs. Alice, Auburndale.
Ives, Henry E., Westhampton.
Lawrence, Susan M., East Northfield.
Martin, J. O., Wilbraham.
Martindale, Gerald, Amherst.
Maud, Lawrence C., Bristol.
Morse, Josephine, South Lancaster.
Mulligan, Mrs. Minna, Natick.
Murch, Mary E., Melrose.
Schmitz, Eugene, Greenwich, Conn.
Sherman, Lillian A., Amherst.
Torrey, E. T., Southbridge.

Total, 19.

SUMMER SCHOOL STUDENTS.

Abercrombie, Rev. R. H., Windsor.
Adams, Faneuil, Brookline.
Adams, Lena R., Worcester.
Adams, Rebecca, Brookline.
Allen, Mary E., Worcester.
Allen, Thomas, Belchertown.
Allis, Abbie L. G., Amherst.
Ames, Fisher, Brookline.
Ames, Rosalie, Brookline.
Ayer, Addie M., Richford, Vt.
Ayer, Elizabeth P., Newport, R. I.
Bailey, Ethel M., Lancaster.
Baker, Florence M., Amherst.
Ball, Minnie, Amherst.
Beckwith, Fanny Leigh, Plainfield, N. J.
Belcher, S. Elizabeth, Worcester.
Bigelow, Lucy M., Amherst.
Boinstein, Sarah, New York, N. Y.
Boinstein, Pauline, New York, N. Y.
Boyer, M. Elmer, Lynn.
Brandow, Melvin, Plymouth.
Brandow, Mrs. Melvin, Plymouth.
Britt, Emma, South Boston.
Bromley, Mae H., Dorchester.
Brooks, Laura J., Stoneham.
Brown, S. Crissy, Stamford, Conn.
Burdick, Catharine Stevens, Newport, R. .
Burgess, Louisa W., Dorchester Center.
Burrage, Ruth Kilburn, Medford.
Butcher, Gertrude, Boston.
Carruth, Frank E., Cohoes, N. Y.
Chapman, Christine, Springfield.
Channing, Hayden, Sherborn.
Charlton, Emanuel C., Heath.
Chase, Rev. L. B., Sunderland.
Cheney, Hazel Chase, Amherst.
Clark, Doris, North Amherst.
Clark, Katherine, North Amherst.
Clark, Ruth Zilpha, Amherst.
Cochrane, A. L., Boston.
Cole, Albert S., North Dartmouth.
Cooledge, Kate A., Boston.
Cota, Florence L., Worcester.
Cox, Edward J., Newtonville.
Cox, Eleanor L., Newtonville.
Cox, Isabella L., Newtonville.
Cox, John E., Newtonville.
Crook, Charles M., Saundersville.
Crooks, Mrs. Charles M., Saundersville.
Cushman, Elizabeth, Harvard.
Cushman, Martha A., Harvard.
Cushman, Esther C., Providence, R. I.
Daly, Margaret, Brushton, N. Y.
Damon, E. Farnham, Concord Junction.
Davies, Rev. D. F., Plainfield.
Davis, Helen, Amherst.
Davis, Helen I., Lynn.
Davis, Lillian E., Boston.
Davis, Marjorie, Sterling.
Day, George Willis, Lynn.

Day, Mrs. George W., Lynn.
Derrick, Rev. Thomas H., Wellfleet.
Downing, Florence E., Everett.
Drinker, Florence L., Brooklyn, N. Y.
Drinker, Minnie F., Brooklyn, N. Y.
Eastman, Laura M., Winchendon.
Edds, Rev. Wm. T., Sag Harbor, N. Y.
Edwards, Arthur C., Bolton.
Eltzholtz, John W., Jacksonville, Ill.
Evans, Mr. E. R., Atlanta, N. Y.
Fay, Louise, Waltham.
Firmin, Mrs. M. A., Medford.
Ford, James, Cambridge.
Ford, Mrs. James, Cambridge.
France, William, Duxbury.
Fruean, Mary A., Dorchester Center.
Gage, Lucy Helen, West Medford.
Gardner, Adaline A., East Boston.
Gifford, Mrs. Alice B., Amherst.
Goodrich, Martha A., South Boston.
Goodnow, Edna M., Amherst.
Gould, Ella F., Brockton.
Graham, Carrie C., New Haven, Conn.
Granger, Helen, Amherst.
Graves, C. Edward, Hatfield.
Gurney, Florence W., ————.
Gurney, Ida B., Marion.
Haffenreffer, August, Jamaica Plain.
Hall, F. Josephine, Waltham.
Hall, Ida Estelle, Waltham.
Harding, Burchan, Mrs., New York
Hardon, Henry C., Newton.
Harrington, Clara B., Montague.
Harris, Mabel Everett, Cambridge.
Hayward, Lewis F., Holyoke.
Hawthorne, Elizabeth S., Dorchester.
Henizen, Henriette M., New York, N. Y.
Hersey, George Milbank, Boston.
Hewes, Elizabeth, Cambridge.
Hogan, Teresa G., Taunton.
Holbrook, Ella M., Dover.
Honnay, Agnes, Amherst.
Honnay, May, Amherst.
Hough, Helen, Northampton.
Howard, Clara B., North Amherst.
Howard, Effie B., North Amherst.
Howell, Lawrence D., Princeton, N. J.
Hubbell, George W., Rochester, N. Y.
Hudson, Cora L., Lock's Village.
Hurd, Mrs. William D., Amherst.
Hutchings, Frank F., Amherst.
Ivey, Rev. John L., Amherst.
Jenkins, Elizabeth, Northampton.
Jenks, Chas. F., Canton.
Jones, Frederick W., Providence, R. I.
Joplin, Flora Yeaton, Haverhill.
Joplin, Josephine M., Hampton, N. H.
Kelley, James P., New York, N. Y.
Kennedy, H. Anna, South Weymouth.
King, Emma H., Boston.
Knightly, Agnes E., Amherst.
Knight, Albert D., New Boston.
Knight, Howard Lawton, Washington, D. C.
Knight, Mrs. Howard Lawton, Washington, D. C.
Lathuner, Hugh, Stryker, O.
Lawler, Margaret E., Amherst.
Learnard, Mrs. Maude B., Newton Center.
Lindsey, Mrs. J. B., Amherst.
Loomis, Herbert Norton, New Britain, Conn.
Lyman, Harriet E., Boston.
Macmahon, Abbie D., Lyndhurst, N. J.
Macmahon, Arthur Whittier, Lyndhurst, N. J.
Macaumber, Clarrissa W., Boston.
March, Mrs. Clara I., Sherborn.
March, Mrs. Emily M., Arlington.
Margetts, Rev. H. G., Angelica, N. Y.
Martin, Elizabeth L., Southbridge.
Martin, John O., Southbridge.
Mattson, Mrs. W. F., Brookline.
Mayo, Stella W., Waltham.
McAfee, French, Port Royal, Pa.
McClenaghan, Rev. S. J., Jamesburg, N. J.
McKnight, Rev. William C., Nottingham, Pa.
Mellor, William H., Waltham.
Merrill, Evan W. D., Somerset.
Merrill, Mrs. Mary E., Somerset.
Miller, E. Cyrus, Hadenville.
Milliken, Fanny Lord, Malden.
Monk, Mrs. H. A., Stoughton.
Morgan, Edith, Amherst.
Morrison, Rev. T. Maxwell, Bellona, N. Y.
Morrison, Mrs. T. Maxwell, Bellona, N. Y.
Moulton, Ada E., North Hampton, N. H.
Mudge, Rev. W. L., Lewiston, Pa.
Murray, Florence H., Cambridge.
Neal, Josephine B., Taunton.
Newhall, Laura L., South Boston.
Nichols, Norman J., North Amherst.
Nickerson, Frances L., Amherst.
Norris, Rev. Thomas F., Plympton.
O'Connor, Mary E., Taunton.
O'Donnell, Miss N. T., Bridgeton, N. J.
Page, Effie M., Dorchester Center.
Page, Florence, Minot.
Paine, Bernard L., West Barnstable.
Parris, Mrs. Clara Howland, Dorchester Center.
Parsons, Elisabeth, Cleveland, O.
Pierpont, Rev. John, Williamsburg.
Piper, Elizabeth B., Cambridge.
Plumb, Sarah H., Amherst.
Polk, Samuel, Colora, Md.
Pool, Lena B., Lynn.
Poore, Harriet P., Boston.
Poore, Mary E., Brockton.
Post, Jessie L., Gilead, Conn.
Pousland, Annie E., Salem.
Prescott, Carl F., Quincy.
Quint, Harry, Roxbury.
Radlo, Dora A., North Adams.
Reymann, Anna, Cambridge.
Riggs, Ezra J., North Carver.
Robinson, Mrs. Alice M., South Boston.
Robinson, Emma C., Mount Vernon, N. Y.
Robinson, Mary B., Waltham.
Roberts, Fanny E., Brooklyn, N. Y.

Robertson, Rev. Wm., Sandwich.
Rowe, Mildred, Amherst.
Sanford, Lewis W., Lincoln.
Sayre, H. Bradley, Geneva, N. Y.
Schmidt, Richard H., Bridgeport, Conn.
Seymour, Florence C., Winsted, Conn.
Seymour, Mary F., Winsted, Conn.
Scribner, Celia A., Boston.
Sherman, Lillian A., Amherst.
Shumway, Ruth, Amherst.
Smith, Ethel M., Amherst.
Smith, Mr. H. W., North Haven, Me.
Southwell, Etta E., Brooklyn, N. Y.
Spaulding, Rev. Arthur, Salem, N. Y.
Spofford, Ellen W., Georgetown.
Springer, Lydia J., Boston.
Stanley, Dorothy, Amherst.
Stevens, Clara E., Boston.
Stevens, M. Dora, New Haven, Conn.
Stone, Mrs. James S., South Framingham.
Sullivan, Nellie L., Three Rivers.
Swett, Ethel S., Beverly.
Swing, M. Ella, Bridgeton, N. J.
Tapley, W. Thorpe, Revere.
Tobin, Ellen C., Lawrence.
Towne, Mary E., Amherst.
Turner, Mable E., North Reading.
Vauthier, Mr. L. P. F., Halifax.
Walden, Margaret C., Deerfield.
Watkins, Fred H., Gilbertsville.
Waugh, Dorothy, Amherst.
Webber, Mrs. Josephine R., Waltham.
Webber, Winona, Newton.
Wheeler, Mildred L., Taunton.
Wheelock, Mr. H. M., Dorchester.
White, Laura Bradstreet, Brighton.
Whitney, Joseph T., Medford.
Wight, Edith A., Waltham.
Williams, Mabelle E., Amherst.
Wilson, Warren H., New York.
Winder, John H., Jr., Coppahosic, Va.
Winn, Annah, Westfield, N. J.
Wo, S. P., Amherst.
Yang, Y. O., Amherst.

Total, 227.

SUMMARY OF SHORT COURSES.

Winter Course Students.

Massachusetts,	53	Maine,	1
Connecticut,	5	Washington, D. C.,	1
New York,	3		—
Pennsylvania,	2		65

Summer School Students.

Massachusetts,	173	Washington, D. C.,	2
New York,	20	Illinois,	1
Connecticut,	8	Maine,	1
New Jersey,	8	Maryland,	1
Rhode Island,	4	Vermont,	1
Pennsylvania,	4		—
New Hampshire,	2		227
Ohio,	2		

Poultry Course.

Massachusetts,	47
New York,	2
Connecticut,	1
New Jersey,	1
	—
	51

Beekeepers.

Massachusetts,	18
Virginia,	1
	—
	19

UNREGISTERED ATTENDANTS.

Rural Conference of Social Workers.

Massachusetts,	289	Colorado,	1
New York,	13	Ohio,	1
Connecticut,	11	Maryland,	1
New Jersey,	5	Rhode Island,	1
New Hampshire,	4	Maine,	2
Vermont,	4	Illinois,	2
Pennsylvania,	4		—
Washington, D. C.,	3		341

Farmers' Week.

Massachusetts,	533	California,	1
Connecticut,	9	Montana,	1
Maine,	4	Michigan,	1
Rhode Island,	3	New Mexico,	1
New York,	3		—
New Hampshire,	2		559
Vermont,	1		

Correspondence Courses.

Massachusetts,	360

SECRETARIES OF ALUMNI ASSOCIATIONS AND CLASSES.

Alumni Secretaries' Association of the Massachusetts Agricultural College.
Secretary: RALPH J. WATTS, 1907, Amherst, Mass.

Associate Alumni of the Massachusetts Agricultural College.
Secretary: SIDNEY B. HASKELL, 1904, Amherst, Mass.

Local Alumni Association of the Massachusetts Agricultural College.
Secretary: SIDNEY B. HASKELL, 1904, Amherst, Mass.

Alumni Club of Massachusetts.
Secretary: HERBERT W. DANA (1899), Care of R. H. White Company, Boston, Mass.

Connecticut Valley Association of the Massachusetts Agricultural College.
Secretary: WALTER B. HATCH, 1905, Torrington, Conn.

Massachusetts Agricultural College Club of New York.
Secretary: JOHN ASHBURTON CUTTER, 1882, 262 West 77th Street, New York, N. Y.

Massachusetts Agricultural College Club of Washington, D. C.
Secretary: CLARENCE H. GRIFFIN, 1904, 3438 Mount Pleasant, Washington, D. C.

Western Alumni Association of the Massachusetts Agricultural College.
Secretary: CHARLES A. TIRRELL, 1906, 4012 Perry Street, Chicago, Ill.

Massachusetts Agricultural College Pacific Coast Alumni Association.
Secretary: THOMAS F. HUNT, 1905, Berkeley, Cal.

Class Secretaries.

Class of	SECRETARY.	Secretary's address.
1871	E. E. Thompson,	Worcester, Mass.
1872	S. T. Maynard,	Northborough, Mass.
1873	C. Wellington,	Amherst, Mass.
1874	– –	– –
1875	M. Bunker,	Newton, Mass.
1876	C. Fred Deuel,	Amherst, Mass.
1877	– –	– –
1878	C. O. Lovell,	48 Summer Street, Boston, Mass.
1879	R. S. Swan,	Worcester, Mass.
1880	– –	– –
1881	J. L. Hills,	Burlington, Vt.
1882	G. D. Howe,	Bangor, Me.
1883	J. B. Lindsey,	Amherst, Mass.
1884	L. Smith,	25 Mercantile Street, Worcester, Mass.
1885	E. W. Allen,	Washington, D. C.
1886	Dr. Winfield Ayres,	616 Madison Avenue, New York, N. Y.
1887	F. H. Fowler,	Shirley, Mass.
1888	H. C. Bliss,	Attleborough, Mass.
1889	C. S. Crocker,	25 South Van Pelt Street, Philadelphia, Pa.
1890	David Barry,	Amherst, Mass.
1891	H. T. Shores,	Northampton, Mass.
1892	H. M. Thomson,	Amherst, Mass.
1893	F. A. Smith,	Ipswich, Mass.
1894	S. F. Howard,	Amherst, Mass.
1895	H. A. Ballou,	Barbadoes, W. I.
1896	– –	– –
1897	C. A. Peters,	Moscow, Idaho.
1898	– –	– –
1899	D. A. Beaman,	Ponce, Porto Rico.
1900	E. K. Atkins,	Northampton, Mass.
1901	J. H. Chickering,	Dover, Mass.
1902	H. L. Knight,	1731 T Street, Washington, D. C.
1903	G. D. Jones,	North Amherst, Mass.
1904	P. F. Staples,	North Grafton, Mass.
1905	P. F. Williams,	Auburn, Ala.
1906	Richard Wellington,	Geneva, N. Y.
1907	J. N. Summers,	Amherst, Mass.
1908	Jas. A. Hyslop,	205 D Street, Washington, D. C.
1909	Charles S. Putnam,	Walpole, N. H.
1910	Henry T. Cowles,	Central High School, Santurce, P. R.

INDEX.

PAGE

Admission 25–40
Advanced standing 39
Agricultural education 44
Agriculture 45
Agronomy 46
Animal husbandry 47
Attendance, summary of 154
Awards. (See Honors.)

Bacteriology 82
Botany 50, 90

Calendar 7
Certificates, admission on 25
Chemistry 52, 90
Civil engineering 74, 76
Clubs, etc. 129–131
College officers 14–17
Committees of faculty 21
Corporation 12
Courses of instruction:
  Undergraduate 41–84
  Graduate 85–94

Dairying 48
Degrees conferred 135
Dormitories 115
Drawing 63

Economics 72–73, 79–81
English 64–69
Entomology 57, 90
Entrance. (See Admission.)
Equipment of departments 120
Examinations, entrance. (See Admission.)
Expenses 115
Experiment station 11, 18
Extension work 95

Faculty 14
Faculty committees 21
Farm administration 49
Fellowships. (See Scholarships.)
Floriculture 60
Forestry 63
French 69

General information 113–131
Geology 84
German 71
Government 72
Graduate school 85

History 73–74
Honors 131

PAGE

Horticulture 58, 90
Humanities 64
Hygiene 78

Itinerant instruction 106

Journalism 65

Landscape gardening 61
Languages, modern European. (See French, German, Spanish.)
Library 125
Literature 64–69, 70–72, 82

Market gardening 63
Massachusetts Agricultural College 9
Massachusetts Agricultural Experiment Station 11
Mathematics 74
Military science 76
Music 72

Organizations, student 129

Physical education 78
Physics 74–76
Political science 72
Pomology 60
Prizes 118–120
Public speaking 68

Religious services 129
Roll of students 137
Rural social science 79

Scholarships 118
Short courses. (See Extension Work.)
Sociology 73
Spanish 70
Student expenses 115
Students, roll of 137
Summer school 102

Table of undergraduate subjects 41–43
Trustees, etc. 12

Unclassified students 40
Undergraduate courses 41–84

Veterinary science 82

Winter school 99

Zoölogy 83, 90

378.744

THE M. A. C. BULLETIN
AMHERST, MASS.
Vol. IV. No. 4. For May, 1912.
Published Six Times a Year by the College.
Jan., Feb., Mar., May, Sept., Oct.
ENTERED AS SECOND-CLASS MAIL MATTER AT THE POST OFFICE, AMHERST, MASS.

Public Document No. 31

CATALOGUE
OF THE
MASSACHUSETTS AGRICULTURAL COLLEGE,
1911-1912.

FORTY-NINTH ANNUAL REPORT.
PART II.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1912.

Without excluding other scientific and classical studies, and including military tactics to teach such branches of learning as are related to agriculture and the mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. — *Acts of Congress, July 2, 1862.*

MASSACHUSETTS AGRICULTURAL COLLEGE,

AMHERST.

CATALOGUE, 1911-1912.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1912.

APPROVED BY

THE STATE BOARD OF PUBLICATION.

THE MASSACHUSETTS AGRICULTURAL COLLEGE.

This issue of the catalogue represents the status of the college for the current college year, with provisional announcement of courses of study and other matters for the year to follow.

The college reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue.

CALENDAR.

1912–13.

REGULAR COURSES.

1912.

January 1, Monday, 1 P.M.,	Winter recess ends; chapel.
January 29, Monday,	Semester examinations begin.
February 5, Monday, 1 P.M.,	Second semester begins; chapel.
February 22, Thursday,	Half holiday, Washington's Birthday.
March 29, Friday, 6 P.M.,	Spring recess begins.
April 8, Monday, 1 P.M.,	Spring recess ends.
April 19, Friday,	Half holiday, Patriot's Day.
May 30, Thursday,	Holiday, Memorial Day.
June 3, Monday,	Senior examinations begin.
June 10, Monday,	Non-senior examinations begin.
June 15–19, Saturday–Wednesday,	Commencement.
June 19–22, Wednesday–Saturday,	Entrance examinations.
September 4–7, Wednesday–Saturday,	Entrance examinations.
September 11, Wednesday, 1.30 P.M.,	First semester begins; chapel.
November 27–December 2, Wednesday, 1 P.M.–Monday, 1.10 P.M., chapel.	
December 20, Friday, 6 P.M.,	Winter recess begins.

1913.

January 6, Monday, 1.10 P.M.,	Winter recess ends; chapel.
January 24, Friday,	Semester examinations begin.
February 3, Monday, 1.10 P.M.,	Second semester begins; chapel.
March 28, Friday, 6 P.M.,	Spring recess begins.
April 7, Monday, 1.10 P.M.,	Spring recess ends.
May 30, Friday,	Holiday, Memorial Day.
May 31, Saturday,	Senior examinations begin.
June 7, Saturday,	Non-senior examinations begin.
June 14–18, Saturday–Wednesday,	Commencement.
June 18–21, Wednesday–Saturday,	Entrance examinations.

MASSACHUSETTS AGRICULTURAL COLLEGE.

HISTORY. — The Massachusetts Agricultural College was among the first of those organized under the national land grant act of 1862. This act granted public lands to the several States and Territories, the funds realized from the sale of which should be used to establish colleges of agriculture and mechanic arts; the bill was framed by the late Senator Justin Smith Morrill of Vermont. The Legislature of Massachusetts has granted money for the erection of the various buildings now on the grounds, and makes annual appropriations for the maintenance of the college.

The college was incorporated in 1863, and on the 2d of October, 1867, was formally opened to its first class of students. At that time four buildings had been erected, and there were four regular instructors employed by the institution. In 1882 the State located its agricultural experiment station on the grounds of the college. Later, after the federal law was passed granting financial aid to experiment stations, the Massachusetts Agricultural Experiment Station was consolidated with the federal station, and subsequently the whole was incorporated with the college.

COURSES. — The college offers an education without tuition fee to any student who is a resident of Massachusetts and who meets the requirements for admission. Women are admitted on the same basis as are men. Students who are not residents of Massachusetts are required to pay a nominal tuition fee. The four-years course leads to the degree of bachelor of science, and the graduate school offers advanced courses leading to the degrees of master of science and doctor of philosophy. The winter school of ten weeks, for admission to which no scholastic requirements are made, is held each winter, beginning early in January. There are other short courses at the college, such as the beekeepers' course and farmers' week. Various forms of extension teaching are carried on away from the college, such as correspondence courses, traveling schools, railway and trolley specials, lecture courses, demonstrations, etc.

PURPOSE OF THE COLLEGE. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement the term "agricultural vocations" is used in its broadest sense. Courses are offered which give efficient training in various agricultural pursuits, such as general farming, dairying, management of estates, poultry husbandry, fruit growing, market gardening, landscape gardening and forestry. Students are also fitted for positions in institutions designed for investigation in many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, for scientific experts in chemistry, entomology and botany, and for business operations having connection with practical agriculture.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences, particularly chemistry, physics and zoölogy, are an essential preparation. Still other students find the course a desirable education, without regard to future occupation. The course of study is designed to give a student a general college education, and in addition to make it possible for him to specialize in any department in which major courses are offered.

LOCATION AND EQUIPMENT. — The agricultural college is located in the town of Amherst. The grounds comprise more than 500 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is about 98 miles from Boston, and may be reached over the Central Massachusetts division of the Boston & Maine Railroad, or by way of the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

THE MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college. It was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about two-fifths of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to the committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, extension work and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

The Corporation.

Members of the Corporation.

	TERM EXPIRES
Davis R. Dewey of Cambridge,	1912
M. Fayette Dickinson of Brookline,	1912
William H. Bowker of Concord,	1913
George H. Ellis of West Newton,	1913
Charles E. Ward of Buckland,	1914
Elmer D. Howe of Marlborough,	1914
Nathaniel I. Bowditch of Framingham,	1915
William Wheeler of Concord,	1915
Arthur G. Pollard of Lowell,	1916
Charles A. Gleason of New Braintree,	1916
Frank Gerrett of Greenfield,	1917
Harold L. Frost of Arlington,	1917
Charles H. Preston of Danvers,	1918
Frank A. Hosmer of Amherst,	1918

Members Ex Officio.

His Excellency Governor Eugene N. Foss, *President of the Corporation.*
Kenyon L. Butterfield, *President of the College.*
David Snedden, *State Commissioner of Education.*
J. Lewis Ellsworth, *Secretary of the State Board of Agriculture.*

Officers of the Corporation.

His Excellency Governor Eugene N. Foss of Boston, *President.*
Charles A. Gleason of New Braintree, *Vice-President.*
J. Lewis Ellsworth of Worcester, *Secretary.*
Fred C. Kenney of Amherst, *Treasurer.*
Charles A. Gleason of New Braintree, *Auditor.*

Standing Committees of the Corporation.[1]

Committee on Finance.

Charles A. Gleason, *Chairman.*
George H. Ellis.
Nathaniel I. Bowditch.
Arthur G. Pollard.
Charles E. Ward.
Frank A. Hosmer.

---

[1] The president of the college is *ex officio* member and secretary of standing committees.

Committee on Course of Study and Faculty.

William Wheeler, *Chairman.*
William H. Bowker.
M. Fayette Dickinson.
David Snedden.
Elmer D. Howe.
Davis R. Dewey.
Frank A. Hosmer.

Committee on Farm.

Nathaniel I. Bowditch, *Chairman.*
Frank Gerrett.
Charles A. Gleason.
George H. Ellis.

Committee on Horticulture.

J. Lewis Ellsworth, *Chairman.*
Davis R. Dewey.
Elmer D. Howe.
Harold L. Frost.

Committee on Experiment Department.[1]

Charles H. Preston, *Chairman.*
J. Lewis Ellsworth.
Arthur G. Pollard.
Charles E. Ward.
Harold L. Frost.

Committee on Buildings and Arrangement of Grounds.

William H. Bowker, *Chairman.*
William Wheeler.
Frank Gerrett.
M. Fayette Dickinson.
Charles H. Preston.

Examining Committee of Overseers.

John Bursley of West Barnstable.
Frank P. Newkirk of Easthampton.
William E. Patrick of Warren.
John J. Erwin of Wayland.
R. Henry Race of North Egremont.

---

[1] The director of the experiment station is a member of the committee on experiment department, without vote.

OFFICERS OF THE INSTITUTION.

THE FACULTY.

[The names of the faculty are arranged in groups according to rank. Within these groups the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held.]

KENYON L. BUTTERFIELD, A.M., LL.D., . . . President's House.
President of the College and Head of Division of Rural Social Science.

GEORGE F. MILLS, A.M., ... 46 Amity Street.
Dean of the College and Professor of Languages and Literature.

CHARLES H. FERNALD, Ph.D., ... 3 Hallock Street.
Honorary Director of the Graduate School.

WILLIAM P. BROOKS, Ph.D., ... 28 Northampton Road.
Director of the Experiment Station and Lecturer on Soil Fertility.

WILLIAM D. HURD, M.Agr., ... 82 Pleasant Street.
Director of the Extension Service.

FRANK A. WAUGH, M.Sc., . . . Massachusetts Agricultural College.
Head of Division of Horticulture and Professor of Landscape Gardening.

JAMES A. FOORD, M.Sc., ... Nutting Avenue.
Head of Division of Agriculture and Professor of Farm Administration.

ROBERT J. SPRAGUE, Ph.D., ... North Amherst.
Head of Division of the Humanities and Professor of Economics and Sociology.

JOSEPH B. LINDSEY, Ph.D., ... 47 Lincoln Avenue.
Goessman Professor of Chemistry.

CHARLES WELLINGTON, Ph.D., ... 34 Amity Street.
Professor of Chemistry.

JAMES B. PAIGE, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Professor of Veterinary Science, Chairman of Division of Science.

GEORGE E. STONE, Ph.D., ... Mount Pleasant.
Professor of Botany.

PHILIP B. HASBROUCK, B.Sc., ... 130 Pleasant Street.
Professor of Physics and Registrar of the College.

JOHN E. OSTRANDER, A.M., C.E., ... 33 North Prospect Street.
Professor of Mathematics and Civil Engineering.

HENRY T. FERNALD, Ph.D., ... 44 Amity Street.
Professor of Entomology and Acting Director of the Graduate School.

GEORGE C. MARTIN, C.E., Captain 18th U. S. Infantry,
35 North Prospect Street.
Professor of Military Science and Tactics.

Edward A. White, B.S., ... Mount Pleasant.
Professor of Floriculture.

William R. Hart, A.M., ... 97 Pleasant Street.
Professor of Agricultural Education.

Fred C. Sears, M.Sc., ... Mount Pleasant.
Professor of Pomology.

Fred C. Kenney, ... Mount Pleasant.
Treasurer of the College.

Robert W. Neal, A.M., ... 7 Woodside Avenue.
Associate Professor of English.

Joseph S. Chamberlain, Ph.D., ... 16 North Prospect Street.
Associate Professor of Organic and Agricultural Chemistry.

William P. B. Lockwood, B.Sc.Agr., . . . 5 East Pleasant Street.
Associate Professor of Dairying.

Elmer K. Eyerly, A.M., ... Amity Street.
Associate Professor of Rural Sociology.

Frederick F. Moon, A.B., M.F., ... 6 Allen Street.
Associate Professor of Forestry.

John A. McLean, A.B., B.Sc.Agr., ... Prospect House.
Associate Professor of Animal Husbandry.

John C. Graham, B.Sc., ... North Amherst.
Associate Professor of Poultry Husbandry.

Guy C. Crampton, Ph.D., ... 86 Pleasant Street.
Associate Professor of Entomology.

S. Francis Howard,[1] M.Sc., ... 10 Allen Street.
Assistant Professor of Chemistry.

A. Vincent Osmun, M.Sc., ... North Amherst.
Assistant Professor of Botany.

Sidney B. Haskell, B.Sc., ... 5 Fearing Street.
Assistant Professor of Agronomy.

Clarence E. Gordon, Ph.D., ... Nutting Avenue.
Assistant Professor of Zoölogy and Geology.

Edgar L. Ashley, A.M., ... Prospect House.
Assistant Professor of German.

Anderson A. Mackimmie, A.B., ... Nutting Avenue.
Assistant Professor of French.

Alexander E. Cance, Ph.D., ... 9 Fearing Street.
Assistant Professor of Agricultural Economics.

Burton N. Gates, Ph.D., ... 42 Lincoln Avenue.
Assistant Professor of Beekeeping.

Edward M. Lewis, A.M., ... 29 Amity Street.
Assistant Professor of English and Assistant Dean of the College.

Charles A. Peters, Ph.D., ... 6 High Street.
Assistant Professor of Inorganic and Soil Chemistry.

Curry S. Hicks, B.Sc., ... 8 Allen Street.
Assistant Professor of Physical Education and Hygiene.

Frederick L. Yeaw, B.Sc., ... 25 North Prospect Street.
Assistant Professor of Market Gardening.

---

[1] On leave of absence.

George S. Gage, Ph.D., ... 42 Lincoln Avenue.
Assistant Professor of Animal Pathology.
George N. Holcomb, A.B., S.T.B., ... Bolton.
Lecturer in History.
Frank W. Rane, M.F., ... Boston.
Lecturer in Forestry.
C. Robert Duncan, B.Sc., ... 31 North Prospect Street.
Instructor in Mathematics.
Charles R. Green, B.Agr., ... Mount Pleasant.
Librarian.
Alvah J. Norman, M.Sc., ... 7 Phillips Street.
Extension Instructor in Pomology.
George F. E. Story, B.Sc., ... 10 Allen Street.
Extension Instructor in Dairying.
Arthur K. Harrison, ... 8 Allen Street.
Instructor in Landscape Gardening.
Chester A. Butman, B.Sc., ... Prospect House.
Instructor in Physics.
Willard A. Wattles, A.M., ... Mount Pleasant.
Instructor in English.
William L. Harmount, A.B., ... Nutting Avenue.
Instructor in French.
Elvin L. Quaife, B.Sc.Agr., ... 9 Fearing Street.
Instructor in Animal Husbandry.
William L. Machmer, A.M., ... Kendrick Place.
Instructor in Mathematics.
Arthur N. Julian, B.A., ... 50 Pleasant Street.
Instructor in German.
Howard DeF. Widger, B.A., ... 13 Spring Street.
Instructor in English and Public Speaking.
Willard A. Turner, Ph.B., ... 31 Amity Street.
Assistant in Chemistry.
Helena Goessmann, Ph.M., ... 44 Amity Street.
Assistant in English.
Samuel R. Parsons, B.Sc., ... 9 Fearing Street.
Assistant in Mathematics and in Military Science.
Frederick A. McLaughlin, B.Sc., ... 120 Pleasant Street.
Assistant in Botany.
Herbert J. Baker, B.Sc., ... —— ——
Assistant in Agronomy.
Harold S. Adams, B.A., ... 32 North Prospect Street.
Assistant in Chemistry.

Graduate Assistants.

Leonard S. McLaine, B.Sc., ... 84 Pleasant Street.
Assistant in Zoölogy.
Marcus T. Smulyan, B.Sc., ... Nutting Avenue.
Assistant in Botany.

William S. Regan, B.Sc., ... 84 Pleasant Street.
Assistant in Entomology.

Raymond G. Smith, B.Sc., ... 5½ East Pleasant Street.
Assistant in Botany.

Other College Officers.

Edwin H. Forristall, M.Sc., . . Massachusetts Agricultural College.
Farm Superintendent.

Ralph J. Watts, B.Sc., ... Nutting Avenue.
Secretary to the President.

Newton Wallace, ... 6 Phillips Street.
Electrician.

P. C. Schroyer, ... 120 Pleasant Street.
Assistant Engineer.

Clarence A. Jewett, ... 112 Pleasant Street.
Superintendent of Buildings.

James Whiting, ... Hallock Street.
Foreman, Department of Floriculture.

William Chesley, ... Draper Hall.
Steward, Dining Hall.

Miss Mary E. Caldwell, ... Draper Hall.
Bookkeeper.

Miss Henrietta Webster, ... Draper Hall.
Clerk, Treasurer's Office.

Miss Dorothy Mudge, ... North Amherst.
Clerk, Treasurer's Office.

Miss Stella H. Webb, ... 9 Phillips Street.
Correspondence Clerk, President's Office.

Miss Lillian M. Gelinas, ... Draper Hall.
Clerk, President's Office.

Miss Alice Gilbert, ... Draper Hall.
Stenographer, Division of Agriculture.

Miss Luliona N. Barker, ... 9 Phillips Street.
Clerk, Division of Agriculture.

Miss Georgia A. King, ... 9 Phillips Street.
Clerk to the Dean and Registrar.

Miss Helen V. Gaskell, ... 105 Main Street.
Stenographer, Division of Floriculture.

Miss Lina Fisher, ... —— ——
Stenographer, Department of Chemistry.

Miss Gladys E. Russell, ... —— ——
Stenographer, Division of Horticulture.

Officers of Short Courses and Extension Service.

William D. Hurd, M.Agr., ... 82 Pleasant Street.
Director.

Earnest D. Waid, B.Agr., ... 17 Fearing Street.
Assistant Director.

Charles H. White, B.Sc., ... North Uxbridge.
Field Agent.

Alvah J. Norman, B.Sc., ... 7 Phillips Street.
Horticulture.

George F. E. Story B.Sc., ... 10 Allen Street.
Dairying and Animal Husbandry.

Miss Mabel R. Case, ... Draper Hall.
Clerk to the Director.

OFFICERS OF THE EXPERIMENT STATION.

William P. Brooks, Ph.D., Director.	28 Northampton Road.
Joseph B. Lindsey, Ph.D., Vice-Director.	47 Lincoln Avenue.
Fred C. Kenney, Treasurer.	Mount Pleasant.
Charles R. Green, B.Agr., Librarian.	Mount Pleasant.

DEPARTMENT OF PLANT AND ANIMAL CHEMISTRY.

Joseph B. Lindsey, Ph.D., Chemist.	47 Lincoln Avenue.
Edward B. Holland, M.Sc., Associate Chemist, in charge of Research Division.	28 North Prospect Street.
Fred W. Morse, Ph.D., Research Chemist.	44 Pleasant Street.
Henri D. Haskins, B.Sc., In charge of Fertilizer Division.	Amherst House.
Philip H. Smith, In charge of Feed and Dairy Division.	102 Main Street.
Lewell S. Walker, B.Sc., Assistant.	19 Phillips Street.
James C. Reed, B.Sc., Assistant.	Nutting Avenue.
Rudolf W. Ruprecht, B.Sc., Assistant.	31 Amity Street.
George R. Pierce, Assistant.	North Amherst.
Carelton P. Jones, Assistant.	—— ——
Joseph P. Howard, Collector.	North Amherst.
Harry J. Allen, Assistant.	Amherst.
James R. Alcock, Assistant in Animal Nutrition.	North Amherst.

DEPARTMENT OF AGRICULTURE.

WILLIAM P. BROOKS, Ph.D., ... 28 Northampton Road.
Agriculturist.
H. J. FRANKLIN, Ph.D., ... Wareham.
In charge of Cranberry Investigation.
EDWIN F. GASKILL, B.Sc., ... North Amherst.
Assistant Agriculturist.

DEPARTMENT OF HORTICULTURE.

FRANK A. WAUGH, M.Sc., . . . Massachusetts Agricultural College.
Horticulturist.
FRED C. SEARS, M.Sc., ... Mount Pleasant.
Pomologist.
JACOB K. SHAW, Ph.D., ... 1 Allen Street.
Assistant Horticulturist.

DEPARTMENT OF BOTANY AND VEGETABLE PATHOLOGY.

GEORGE E. STONE, Ph.D., ... Mount Pleasant.
Botanist and Vegetable Pathologist.
GEORGE H. CHAPMAN, M.Sc., ... 13 Fearing Street.
Assistant Botanist.
EDWARD A. LARRABEE, B.Sc., ... Clark Hall.
Assistant Botanist.

DEPARTMENT OF ENTOMOLOGY.

HENRY T. FERNALD, Ph.D., ... 44 Amity Street.
Entomologist.
BURTON N. GATES, Ph.D., ... 42 Lincoln Avenue.
Apiarist.
ARTHUR I. BOURNE, B.A., ... 66 North Pleasant Street.
Assistant in Entomology.

DEPARTMENT OF VETERINARY SCIENCE.

JAMES B. PAIGE, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Veterinarian.

DEPARTMENT OF METEOROLOGY.

JOHN E. OSTRANDER, A.M., C.E., . . . 35 North Prospect Street.
Meteorologist.
ROYAL N. HALLOWELL, ... Massachusetts Agricultural College.
Observer.

OTHER OFFICERS OF THE EXPERIMENT STATION.

HERBERT J. BAKER, ... Massachusetts Agricultural College.
Secretary to the Director.
MRS. LUCIA G. CHURCH, ... 4 Hallock Street.
Stenographer, Director's Office.

Miss F. Ethel Felton, ... 9 Phillips Street.
Stenographer, Department of Plant and Animal Chemistry.
Miss Bridie O'Donnell, ... Hadley.
Stenographer, Department of Entomology.
Miss Alice M. Howard, ... North Amherst.
Stenographer, Department of Plant and Animal Chemistry.
Miss Jessie V. Crocker, ... Sunderland.
Stenographer, Department of Botany.

COMMITTEES OF THE FACULTY.[1]

1911–12.

CATALOGUE AND OTHER PUBLICATIONS.

Associate Professor NEAL.
Associate Professor EYERLY.
Assistant Professor CANCE.

COMMENCEMENT.

Professor PAIGE.
Professor WELLINGTON.
Captain MARTIN.
Professor WHITE.
Mr. KENNEY.
Mr. DUNCAN.

COURSE OF STUDY.

Professor HART.
Professor WAUGH.
Professor FOORD.
Professor SPRAGUE.
Professor OSTRANDER.
Associate Professor CHAMBERLAIN.

DISCIPLINE (ADVISORY).

Professor MILLS.
Professor HASBROUCK.
Captain MARTIN.
Assistant Professor GORDON.
Assistant Professor MACKIMMIE.
Assistant Professor LEWIS.

EMPLOYMENT.

Professor SEARS.
Mr. KENNEY.
Assistant Professor HASKELL.

ENTRANCE EXAMINATIONS AND ADMISSION.

Professor HASBROUCK.
Assistant Professor OSMUN.
Assistant Professor ASHLEY.
Assistant Professor PETERS.
Mr. MACHMER.
Mr. WATTLES.

---

[1] The president of the college is ex officio member of these standing committees.

GRADUATE SCHOOL.

Professor FERNALD.
Professor LINDSEY.
Professor PAIGE.
Professor STONE.
Professor SEARS.
Assistant Professor GORDON.

LIBRARY.

Professor STONE.
Professor BROOKS.
Professor WELLINGTON.
Assistant Professor CANCE.

PHYSICAL EDUCATION AND ATHLETICS.

Professor PAIGE.
Assistant Professor LEWIS.
Assistant Professor HICKS.

SCHEDULE.

Professor OSTRANDER.
Associate Professor NEAL.
Associate Professor LOCKWOOD.

SCHOLARSHIP.

Assistant Professor GORDON.
Professor MILLS.
Professor HASBROUCK.
Assistant Professor MACKIMMIE.
Assistant Professor LEWIS.

STUDENT LIFE.

Professor HURD.
Associate Professor CHAMBERLAIN.
Associate Professor MCLEAN.
Assistant Professor HASKELL.
Assistant Professor MACKIMMIE.
Assistant Professor LEWIS.
Assistant Professor HICKS.

UNCLASSIFIED STUDENTS.

Professor WHITE.
Associate Professor LOCKWOOD.
Assistant Professor PETERS.

THE COLLEGE.

ADMISSION.

A. APPLICATION FOR ADMISSION.

Correspondence about admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege on or before June 1 of the year in which examination is desired. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. MODES OF ADMISSION.

Students are admitted to the freshman class either upon *certificate* or upon *examination*. No *diploma* from a secondary school will be considered.

CERTIFICATES. — The entrance requirements may be met by certification in any of the following ways: —

1. By presenting certificate from a school approved for such privilege by this college.

2. By presenting certificate from any school approved by the college entrance examination boards.

3. By presenting the customary credentials from the Board of Regents of the State of New York for any of the subjects of the entrance requirements.

Certificates must present not less than seven of the necessary fourteen credits in all. Those subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.[1]

Places of Examination. — Examinations for admission to the college are held as follows: —

In June of each year: in Amherst, in the building of the Department of Mathematics, Massachusetts Agricultural College; in Boston, in the College of Liberal Arts of Boston University, Boylston Street, corner of Exeter; in Worcester, in Horticultural Hall.

In September, examinations will be held in Amherst only.

Schedule for Entrance Examinations, June 21–24, 1912. — The examinations in June will follow this schedule: —

First Day.

1 P.M.	Registration.[2]
1.15–5 P.M.	Latin (A and B).

Second Day.

8 A.M.	Plane geometry.
10 A.M.	Chemistry.
11.30 A.M.	United States history and civics.
2 P.M.	Algebra.
3.30 P.M.	Physics.
4.30 P.M.	Elective English.

Third Day.

8 A.M.	Required English.
11 A.M.	Solid geometry, agriculture.
2 P.M.	History, required and elective.
5 P.M.	Botany.

Fourth Day.

8 A.M.	French, German, required and elective.
1 P.M.	Greek, and all one-half credit electives, except those already noted.

---

[1] *Entrance with Condition in English.* — Under the rule permitting entrance conditions of not more than two units of the preparatory subjects applicants may be admitted, upon examination, with a condition in English, provided that they show, upon examination, satisfactory preparation in work entitling them to a ranking of 60 or higher.

The purpose of this provision is to avoid the possible injustice of excluding, without further trial, applicants who appear to be deficient in preparation in only one subject.

Attention is called to the standing rule of the uniform entrance requirement bodies concerning English as an admission subject: namely, that applicants whose work is seriously lacking in correct spelling, punctuation, grammar or other elementary essentials of good usage will be rejected.

Students so admitted, must, to remove the condition, pass an examination covering the regular 3-units requirement.

[2] Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.

Schedule for Entrance Examinations in September. — In September, 1912, the examinations will be given September 11–14, inclusive, and will follow the order indicated for June, beginning September 11 at 1 P.M.

C. REQUIREMENTS FOR ADMISSION.

The requirements for admission are based on the completion of a four-years course in a high school or its equivalent, and are stated in terms of units. The term unit means the equivalent of four or five recitations a week for a school year. Neither more nor less credit will be given in any subject than is indicated in the table below. Fourteen units must be offered for admission, of which nine are required and five are elective.[1]

(*a*) The following nine units are required: —

Language.	
English,	3
French or German,	2
History and Civics.[2]	
United States history and civics,	½
History (elective),	1
(*a*) Ancient history.	
(*b*) Medieval and modern history.	
(*c*) English history.	
(*d*) General history.	
Mathematics.	
Algebra, through progressions,	1½
Plane geometry,	1

(*b*) In addition to the requirements under (*a*), five units must be offered from the following-named elective subjects. Not more than four of those subjects in which the credit sought is one-half unit will be accepted.

Language.	
English in addition to requirements,	1
French in addition to requirements,	2 or 1[3]
German in addition to requirements,	2 or 1[3]

---

[1] After September, 1913, the entrance credits will be divided as follows: 8½ from group A, 5½ from group B.

[2] Hereafter one unit in history will be required. In group (*a*) of the requirement for entrance United States history and civics will be put on the same basis with the other history requirement.

[3] If but one elective unit be offered, it must be in the same language as that offered to meet the two-year language requirement.

Greek,	2 or 3
Latin,	2 or 3

Latin A, including Cæsar and Cicero or prose composition, 2; Latin B, including Virgil and prose composition, 1.

History.

In addition to requirements,	1, 2, or 3

Mathematics, and Other Sciences.

Solid geometry,	½
Trigonometry,	½
Chemistry,	1
Physiography,	½
Physiology,	½
Agriculture,[1]	½ or 1
Botany,[1]	½ or 1
Geology,[1]	½
Physics,[1]	1
Zoölogy,[1]	½
Commercial geography,[2]	½
Drawing,[2]	½
Manual training,[2]	½ or 1

PRESENTATION OF NOTE-BOOKS. — The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 1).

Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificate should not present note-books; but their certificate must state that note-books have been satisfactorily completed.

D. STATEMENT OF PREPARATION REQUIRED FOR ADMISSION.[3]

In some cases the requirements of the College Entrance Examination Board are here mentioned. A pamphlet containing detailed explanation of these requirements can be had of the Board for 10 cents. Address substation 84, New York City.

AGRICULTURE. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade. The examination in agriculture will be given in September only.

---

[1] Note-book required as part of preparation will be credited as part of the examination.

[2] Certification necessary in these subjects; no examinations given.

[3] In alphabetical order by subjects.

Botany. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Stevens's "Introduction to Botany" and Bergen and Davis's "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit; and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

Chemistry. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements, some of the experiments being quantitative. The keeping of a note-book is required.

Commercial Geography. — Preparation should be given in a course equivalent to that laid down in Adams's "Commercial Geography," Trotter's "Geography of Commerce," or a similar work.

Drawing. — Applicants may offer either freehand or mechanical drawing, or both. They must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable them to draw correctly a simple geometric model from memory; or, if they present mechanical drawing, they must have considerable working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented see "Manual Training."

English. — Preparation in English should develop in the candidate (1) ability to express himself well and correctly in his mother tongue, and (2) ability to penetrate through language to the meaning that underlies it.

All candidates for admission — whether by examination or by certification — are urged to secure a thorough training in composition, in which at least part of the subjects written on shall be derived from personal observation, experience and thought. They are urged to cultivate especially, in all their writing, the habit of correctness in spelling, grammar, punctuation, sentence structure and paragraph building. This habit will be of much greater help to them in their work in the college than will mere knowledge of the prescribed books.

In the examination, direct questions may be put, including questions upon grammar. Several compositions, each about one hundred and fifty words long, will be required, including papers to test the candidate's ability to think and write clearly, either on matters involving personal experience or on topics involving knowledge of the books. All candidates received as members of the freshman class are expected to be able — as a result of their study of the books prescribed " For Study and Practice " — to paraphrase or interpret, with some insight, unfamiliar verse or prose of medium difficulty, in which the meaning does not depend on anything outside the passage itself; and, as part of every examination, at least one passage is given for such interpretation.

The list of books for 1912 is made up from the list recommended by the Conference on Uniform Entrance Requirements in English. The examination will be based upon these; but an applicant who has prepared upon other books of the longer list will be examined thereon if he notify the Department of English of his wish before the first day of June preceding the examinations.

For 1912: —

(*a*) For reading and composition practice: Shakspere's " As You Like It " and " Julius Cæsar; " Franklin's " Autobiography; " Goldsmith's " The Deserted Village; " Dickens's " A Tale of Two Cities; " George Eliot's " Silas Marner; " Irving's " Sketch Book; " Scott's " The Lady of the Lake; " Byron's " Mazeppa " and " The Prisoner of Chillon; " and Macaulay's " Lays of Ancient Rome."

(*b*) For thorough study and practice: Shakspere's " Macbeth; " Milton's " Comus," " L'Allegro " and " Il Penseroso," or Tennyson's " Gareth and Lynette," " Lancelot and Elaine " and " The Passing of Arthur; " Burke's " Speech on Conciliation with America," or Washington's " Farewell Address " and Webster's " First Bunker Hill Oration; " Macaulay's " Life of Johnson," or Carlyle's " Essay on Burns."

For 1913, 1914, 1915: —

English Grammar and Composition. — Command of correct and clear English (spoken or written) requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, paragraphs, and the different kinds of whole composition, including letter writing, should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise narration, description and easy exposition and argument based upon simple outlines. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

Literature. — Ability to read with accuracy, intelligence and appreciation is sought through study of books included in two lists, headed respectively "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud, and encouraged to commit to memory some of the more notable passages, both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads, and with their place in literary history.

(*a*) Reading: The aim of this course is to foster in the student the habit of intelligent reading, and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from which at least ten units (each unit being set off by semicolons) are to be selected, two from each group: —

I. The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of books XI., XIII., XIV., XV., XVII., XXI.; Virgil's "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any unit of this group a unit from any other group may be substituted.

II. Shakspere's "Merchant of Venice;" "Midsummer Night's Dream;" "As You Like It;" "Twelfth Night;" "Henry the Fifth;" "Julius Cæsar."

III. Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" either Scott's "Ivanhoe" or "Quentin Durward;" Hawthorne's "House of the Seven Gables;" either Dickens's "David Copperfield" or "A Tale of Two Cities;" Thackeray's "Henry Esmond;" Mrs. Gaskell's "Cranford;" George Eliot's "Silas Marner;" Stevenson's "Treasure Island."

IV. Bunyan's "Pilgrim's Progress," Part I.; "The Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography" (condensed); Irving's "Sketch Book," Macaulay's "Essays on Lord Clive" and "Warren Hastings;" Thackeray's "English Humourists;" selections from Lincoln, including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address and the letter to Horace Greeley, along with a brief memoir or estimate; Parkman's "Oregon Trail;" either Thoreau's "Walden," or Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge;" "A Liberal Education" and "A Piece of Chalk;" Stevenson's "Inland Voyage" and "Travels with a Donkey."

V. Palgrave's "Golden Treasury" (first series), books II. and III., with especial attention to Dryden, Collins, Gray, Cowper and Burns; Gray's "Elegy in a Country Churchyard" and Goldsmith's "Deserted Village;" Coleridge's "Ancient Mariner" and Lowell's "Vision of Sir Launfal;" Scott's "Lady of the Lake;" Byron's "Childe Harold," Canto IV., and "Prisoner of Chillon;" Palgrave's "Golden Treasury" (first series), book IV., with especial attention to Wordsworth, Keats and Shelley; Poe's "Raven," Longfellow's "Courtship of Miles Standish," and Whittier's "Snow Bound;" Macaulay's "Lays of Ancient Rome" and Arnold's "Sohrab and Rustum;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home

Thoughts from the Sea," "Incident of the French Camp," "Hervé Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City."

(*b*) Study: This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. For this close reading are provided a play, a group of poems, an oration and an essay, as follows: —

Shakspere's "Macbeth;" Milton's "L'Allegro," "Il Penseroso" and "Comus;" either Burke's "Speech on Conciliation with America," or both Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" either Macaulay's "Life of Johnson," or Carlyle's "Essay on Burns."

Examination.[1] — However accurate in subject-matter, no paper will be deemed satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which may be taken as a preliminary, and the other as a final.

The first part of the examination will be based upon ten units chosen, in accordance with the plan described earlier, from the lists headed reading; and it may include also questions upon grammar and the simpler principles of rhetoric, and short compositions upon topics drawn from the student's general knowledge or experience. On the books prescribed for reading, the form of the examination will usually be the writing of short paragraphs on several topics which the candidate may choose out of a considerable number. These topics will involve such knowledge and appreciation of plot, character-development and other qualities of style and treatment as may be fairly expected of boys and girls. In grammar and rhetoric, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors.

The second part of the examination will include composition and those books comprised in the list headed study. The test in composition will consist of one essay or more, developing a theme through several paragraphs; the subjects will be drawn from the books prescribed for study, from the candidate's other studies and from his personal knowledge and experiences quite apart from reading. For this purpose the examiner will provide several subjects from which the candidate may make his own selections. The test on the books prescribed for study will consist of questions upon their content, form and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their other works, and the periods of literary history to which they belong.

---

[1] Read in connection with this statement the first three paragraphs under "English," pp. 29, 30.

ENGLISH, ELECTIVE. — To secure a fourth entrance credit in English, the applicant should do (*a*) the full equivalent of three years' work (required English), and also (*b*) the full equivalent of a fourth year's work. Applicants not certified with a fourth entrance credit will be examined. In order, however, that examination questions may be prepared, the applicant for examination should notify the Department of English by the first of June preceding the examinations, stating which English subject or subjects he wishes to present.

Subjects accepted. — The applicant may offer (*a*) any one of the subjects stated hereunder, or (*b*) any two of these subjects in combination.

(*a*) History of American literature.

(*b*) History of English literature (or lives of the great authors).

(*c*) Classics *other than those read to meet the three-credit requirement, the applicant to present a complete list of his readings for all four years.* The reading for the fourth credit should be of the same detailed, careful kind as is given the books prescribed for "Reading and Practice" in the official list of entrance requirement readings.

(*d*) Advanced composition.

(*e*) History of the English language.

(*f*) Advanced high school grammar.

Advanced Standing in College. — Whether advanced standing shall be given applicants entering with a fourth credit in English will be determined by consideration of each case individually. Much weight is given to the ability of the student to express himself correctly and clearly, to think clearly, and to grasp the meaning of printed language. A special examination will be given in the opening week of college, notice of which will be posted on the English bulletin board, for freshmen who wish to apply for advanced standing.

Presentation of Note-books and Themes. — Applicants for examination, either for fourth-unit credit or for advanced standing, are advised to present the note-books, themes, etc., prepared by them in the preparatory school, as an aid toward determining their proficiency.

GREEK. — Greek will receive credit as an elective requirement upon either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first four books of Xenophon's "Anabasis," and (*b*) the translation of passages of Attic prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages from the first six books of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the form and constructions of the passages.

HISTORY.[1] — Of the one and one-half required units the one-half unit must be offered in United States history and civics, and the one required unit must be offered in either ancient history, medieval and modern history, English history or general history. Either one or two elective units in any one of the historical subjects here named may be offered, provided that such units may not be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on an outline map.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers, in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

LATIN. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

---

[1] Hereafter one unit in history will be required, United States history and civics being placed upon the same basis with the other history requirement.

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (*b*) the translation of passages of Latin prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from either books I. to VI. of Virgil's "Æneid," or six orations of Cicero, including those against Catiline; and (*b*) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," books I. to IV.

MANUAL TRAINING. — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

MATHEMATICS. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents, the formulas for the *n*th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work should consist of both class-room work and laboratory practice. The work covered in the class room should be equal to that outlined in Hall & Bergen's "Text-book of Physics;" the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOLOGY. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body: Briefer Course."

ZOÖLOGY, PHYSIOGRAPHY, GEOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis's "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present a note-book, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

E. Admission to Advanced Standing.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. Other Information about Entrance.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)
2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.
3. Candidates must receive credit for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. No candidate deficient in both algebra and plane geometry will be admitted.
4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination, in the week following the Thanksgiving recess. (2) Second entrance condition examination, in the sixteenth week of the first semester.
5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.
6. Examinations in part of the subjects required for entrance may be taken one year before entering college.

7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses see "Short Courses."

9. All requests for information concerning admission of unclassified students should be addressed to Prof. E. A. White, chairman of committee on unclassified students.

G. Unclassified Students.

Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

1. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-years high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

2. No applicant under twenty-one years of age will be admitted as an unclassified student.

3. Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

4. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

5. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

6. All unclassified students are subject to the supervision of a special committee.

7. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

8. Unclassified students are subject to the regulations applying to classified students.

9. No student of this or any other institution who has not done efficient work therein shall be permitted to register as an unclassified student.

10. No unclassified student shall be allowed to participate in any intercollegiate contests.

COURSES OF INSTRUCTION.

A. TABLE OF UNDERGRADUATE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

FRESHMAN YEAR.

First Semester.

[All work required.]

Chemistry,	3
Algebra,	3
Solid geometry,[1]	2
English,	4
Public speaking (at option of instructor),	1
French or German,[2]	4
Drill,	1
Hygiene,	1
College life (attendance without credit).	
	18 or 19

Second Semester.

[All work required.]

Animal husbandry,	2
Chemistry,	3
Trigonometry,	3
Algebra,	2
English,	4
Public speaking (if not taken in semester [1]),	1
French or German,	4
Drill,	1
Physical education,	1
	20 or 21

SOPHOMORE YEAR.

Frst Semester.

[All work required.]

Agronomy,	3
Physics,	5
Zoölogy,	3
English,	2
French or German,	3
Tactics,	1
Drill,	1
	18

---

[1] To be taken in course when not offered for entrance.

[2] Students may continue in college the language that they present for admission, or they may take the other; but they must continue whichever language they so elect until the end of the first semester of the sophomore year. Eleven college credits are required in this language.

Second Semester.

[All courses under "Required," with any two of those under "Elective."]

[Required.]

Elementary horticulture,	2
Botany,	4
English,	2
Agricultural industry,	3
Drill,	1
Tactics,	1
Physical education,	1
	14

[Elective.]

French or German, Animal husbandry, Geology, Physics, Chemistry, Surveying,	Each 3 hours. Any two,	6
		20

JUNIOR AND SENIOR YEARS.

[Effective to June, 1912, only.]

In the junior and in the senior year, work must be taken each semester amounting to not fewer than seventeen nor more than twenty credits.

[Required.]

The following-named subjects are required after the sophomore year, as indicated: —

Military science, two credits each semester of junior year,	4
Physical education, one credit (second semester),	1
Political science (Course 1, Economics),	3
English,	3

[Elective.]

Unless otherwise stated, elective courses to the end of the college year of 1911–12 are open to both juniors and seniors. Elections are subject to such provisions as either the faculty or the instructors in the courses may declare.

MAJORS.

Beginning with September, 1912, a plan of major courses will become operative. For statement, see Addendum.

STARRED COURSES.

Courses the number of which is marked with a star are announced provisionally only.

B. UNDERGRADUATE COURSES.

[All courses given in the first semester bear odd numbers; all given in the second semester bear even numbers. Studies are pursued in courses, "course" implying the study given a subject within one semester, without regard to the total number of hours or to the number of credits. The special mention of certain courses as prerequisite to other courses does not imply that no courses but those so mentioned are "preliminary or preparatory" within the meaning of paragraph 10, page 10 of the Rules.]

DIVISION OF AGRICULTURE.

Professor Foord.

AGRONOMY.

Assistant Professor Haskell, Dr. Brooks, Mr. Baker.

Required Course.

1. Soils and Fertilizers. — A study of the formation, classification and physical and chemical properties of soils. This is followed by study of methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments. Prerequisites, Chemistry 1 and 2. Sophomores; 3 lecture hours. Credit, 3.

Assistant Professor Haskell.

Elective Courses.

3. Field and Forage Crops. — History, classification, cultivation and harvesting, commercial grading and valuation. The crops studied are the cereal grains, grasses, legumes, forage crops, and those "money crops" of importance in New England. The laboratory work includes the testing of the purity and vitality of the seeds of the different field crops, valuation and judging thereof, and study of the varieties suited to New England conditions. Prerequisites, Agronomy 1 and Botany 2; 2 lectures and 1 laboratory period. Credit, 3. Assistant Professor Haskell.

4. Advanced Field Crops. — This course takes up the question of breeding and improvement of the crops studied in Agronomy 3; study of seed stock as offered in the market, testing of germination, purity and estimation of valuation; and the methods of production, harvesting and curing. Prerequisites, Agronomy 3 and Botany 2. Juniors and seniors; 1 laboratory period and 2 lecture periods weekly. Credit, 3. Assistant Professor Haskell.

5. Advanced Soils. — A field, laboratory and lecture course on soils; their nature, composition, physical qualities, improvement. Field work, as far as the season allows, consists of detailed soil surveys in different parts of the Connecticut valley; this followed by laboratory work on the physical properties of the soil collected, on the effect of fertilizers on the soil, and on the mixing of fertilizers. Prerequisites, Agronomy 1 and Chemistry 2. Juniors and seniors; 1 lecture period and 1 four-hour laboratory period weekly. Credit, 3.
Assistant Professor Haskell.

6. Drainage and Irrigation. — A field and lecture course on soil improvement, by drainage and irrigation. As a thesis each man is required to take an area of wet or swampy land and to present plans and estimates for its reclamation. Prerequisites, Agronomy 1 and Mathematics 8. Juniors and seniors; 1 four-hour laboratory period and 1 lecture period weekly. Credit, 3.
Assistant Professor Haskell.

8. Manures and Fertilizers. — An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Each of the important manures and fertilizers will be discussed, its origin and its chemical and physical characteristics being considered. Each material taken up will be studied in relation to its capacity to supply plant food and to its effects upon soil texture, moisture, temperature and flora. Considerable attention will be devoted to consideration of the experimental work which has been done, and which is now in progress, in manures and fertilizers. For seniors only. Prerequisite, Agronomy 1; 3 lectures a week, with occasional seminars. Credit, 3. Dr. Brooks.

ANIMAL HUSBANDRY.

Associate Professor McLean, Mr. Quaife.

Required Courses.

2. Elementary Judging. — A study of the different market classes and grades of horses, cattle, sheep and swine. The purpose of this course is to familiarize beginners with the different classes of stock, and to give them a grounding in live-stock judging. Text-book, Craig's "Live Stock Judging." Freshmen; 2 judging laboratories each week. Credit, 2.
Associate Professor McLean and Mr. Quaife.

Elective Courses.

3. Breeds and Types of Live Stock.[1] — A course covering the origin, history, development and characteristics of the different breeds of horses, cattle, sheep and swine. Prerequisite, Animal Husbandry 2. Text-book, Plumb's "Breeds and Types of Farm Animals." Sophomores; 1 lecture and 2 laboratories. Credit, 3.
Associate Professor McLean and Mr. Quaife.

5. Principles of Breeding. — Prerequisite, Zoölogy 1. Text-book, Davenport's "Principles of Breeding." Juniors; 3 lectures. Credit, 3. Associate Professor McLean.

6. Live-stock Management. — The work of this course consists of laboratory work by the individual students in the handling of live stock; with horses, such work as halter breaking, breaking to drive, driving, harnessing, casting, and fitting for show will be done; similarly, the practical handling of cattle, sheep and swine will be fully treated. Special study is given to halter making, splicing, hitches, knots and all rope work. Prerequisite, Animal Husbandry 4. Juniors; 1 laboratory. Credit, 1.
Mr. Quaife.

8. Advanced Stock Judging. — This course is designed to equip Animal Husbandry students in the judging of classes of different types of live stock, to strengthen them in the selection of superior sires, and equip them for stock judging at fairs. Visits will be made to the best herds of the various breeds of stock in the State. Judging teams to represent the college will be largely selected from this class. Prerequisite, Animal Husbandry 4. Juniors; 2 laboratory periods. Credit, 2.
Associate Professor McLean.

9. Feeding and Management. — A study of the principles of animal nutrition; of the composition and qualities of feeding materials; of the feeding, care and management of dairy cattle from birth to maturity, with especial attention to economic production; a similar study of beef animals and beef production. Prerequisite, Animal Husbandry 4. Text-book, Henry's "Feeds and Feeding." Three lectures. Credit, 3. Associate Professor McLean.

---

[1] Formerly Course 4; will be given in fall semester in 1912–13, elective to qualified sophomores.

10. FEEDING AND MANAGEMENT. — A continuation of Course 9, dealing in a similar manner with horses, sheep and swine. Prerequisite, Course 9. Seniors; 3 lectures a week. Credit, 3.
Associate Professor McLEAN.

11. HERD AND STUD-BOOK STUDY. — An advanced course of the study of the breeds of live stock, familiarizing the student with the most productive sires and dams of the various breeds, and the successful lines and methods of breeding. Prerequisites, Animal Husbandry 5 and 8. Seniors; 2 hours a week. Credit, 2.
Associate Professor McLEAN.

DAIRYING.

Associate Professor LOCKWOOD, Mr. STORY.

Elective Courses.

1. MILK AND ITS COMPOSITION. — The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; methods in economic milk production; methods for testing herds and developing them to higher efficiency; the study of analysis of milk products by use of the Babcock test for fat, test for acidity and adulteration, and ordinary preservatives; moisture tests for butter; problems. Must be preceded or accompanied by Animal Husbandry 5; 2 lecture hours and 1 laboratory period. Credit, 3.
Associate Professor LOCKWOOD.

2. BUTTERMAKING. — A study of hand and factory separators, separator instruction and cream separation; handling milk and cream for buttermaking on the farm and in the factory; preparation of home-made and commercial starters, and ripening cream; churning; recording work; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy machinery and care thereof; practical mechanics as applied to the creamery. Prerequisite, Course 1; 2 laboratory periods and 1 lecture hour. Credit, 3. Associate Professor LOCKWOOD.

3. DAIRY BACTERIOLOGY. — A study of bacteriology relative to market milk and dairy work. Prerequisite, Courses 1 and 2; 2 laboratory periods and 1 lecture hour.
Associate Professor LOCKWOOD.

4. MARKET MILK AND MILK PRODUCTS. — A study of market milk conditions, extent and development of the business; supply

and delivery; food value of milk and its use as food; milk and its relation to the public health; methods for the proper handling and preparing of milk and cream for direct consumption; certified milk, requirements and production; pasteurizing; sterilizing; standardizing and modifying; milk laws and inspection. The manufacture of milk products other than butter, including cheese; condensed milk; cottage cheese, casein, milk powder, ice cream, etc. Prerequisites, Courses 1, 2 and 3; 1 laboratory period and 2 lecture hours. Credit, 3. Associate Professor Lockwood.

5. Dairying. — A course designed primarily for teachers of secondary agriculture. The work given will cover briefly the composition and secretion of milk, the Babcock fat test, the relation of bacteria to dairy work, principles of creaming, separators, elementary butter making, proper method of handling milk and cream, and the relation of market milk to the public health. One lecture, 1 two-hour laboratory period. Credit, 2.
Associate Professor Lockwood.

FARM ADMINISTRATION.

Professor Foord.

Elective Courses.

3. Farm Buildings and Machinery. — A study of the material equipment of the farm aside from the land; farm buildings, their location, plan and arrangement; water supply; fencing problems; farm power; farm machinery; wagons. Prerequisite, Agronomy 1, Animal Husbandry 2 and Mathematics 5; 2 laboratory periods and 1 lecture hour. Credit, 3. Professor Foord.

4. Farm Management. — The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts. Prerequisites, Agronomy 1 and 3 and Animal Husbandry 2; 2 lecture or recitation hours and 1 seminar period. Credit, 3. Professor Foord.

POULTRY HUSBANDRY.

Associate Professor GRAHAM.

Elective Courses.

1. ELEMENTS OF POULTRY CULTURE. — This course consists of a comprehensive study of poultry-house construction, poultry-house equipment, winter egg production, breeds and types of poultry. Two lectures. Credit, 2. Associate Professor GRAHAM.

2. ELEMENTS OF POULTRY CULTURE. — This is a continuation of Course 1, treating the subjects of incubation, brooding, care of growing stock, market poultry, including capons, roasters and broilers, and diseases of poultry. Two lectures. Credit, 2.
Associate Professor GRAHAM.

3. POULTRY PRACTICE WORK. — This is a practical laboratory course in poultry carpentry, caponizing, killing and picking, dressing and packing poultry, also sorting and preparing eggs for market. Must be preceded by or accompanied by Course 1. One laboratory period. Credit, 1. Associate Professor GRAHAM.

4. INCUBATION AND BROODING. — In this course students are required to set up and operate incubators and brooders, make a systematic study of the development of the chick in the egg, and the care of sitting hens. This course must be preceded or accompanied by Course 2. One to 3 credits. Time to be arranged.
Associate Professor GRAHAM.

5. PEN MANAGEMENT. — This is a practical laboratory course. Students are required to care for a pen of fowls, keeping accurate records of eggs produced, food consumed, weather conditions, health of fowls, and profit and loss. Prerequisite, Course 1. One credit. Time to be arranged. Associate Professor GRAHAM.

6. POULTRY MANAGEMENT. — In this course a detailed study of large poultry farms and equipment, such as bone cutters, feed cutters, cramming machines, etc., will be carried on. It includes laying out and planning poultry buildings of all kinds, the mating of fowls and the preparing of birds for exhibition. Poultry diseases and investigation work carried on by experiment stations is prominent in this course. A few good poultry plants will be visited

by the class for practical demonstrations. Prerequisites, Courses 1, 2, 3 and 4. Two lectures, 1 laboratory period. Credit, 3.

Associate Professor GRAHAM.

7. ADVANCED POULTRY JUDGING. — This course includes a study of the origin and history of breeds and varieties, poultry organizations and poultry shows. The American Standard of Perfection will be used as a text. Prerequisites, Courses 1, 2, 3, 4 and 5. One lecture and 2 laboratory periods. Credit, 3.

Associate Professor GRAHAM.

9. MARKET POULTRY AND POULTRY PRODUCTS. — This course includes the study of market classifications of poultry, eggs and feathers; the requirements of different markets, methods of marketing, advantages and disadvantages of cold storage of poultry and eggs. Students will be required to fatten several lots of chickens by different methods and rations. Accurate data must be kept, showing the gain in weight and quality, also the cost of feed, labor, etc., and the profit and loss. Judging and scoring of market poultry, both alive and dressed, and market eggs will be an important feature of this course. Prerequisites, Courses 1, 2 and 3. One lecture or conference period and laboratory work. Laboratory periods to be arranged. Credit, 3.

Associate Professor GRAHAM.

DIVISION OF HORTICULTURE.

Professor WAUGH.

[The general subject of horticulture divides naturally into the subjects of pomology, floriculture, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore here grouped under the general designation of horticulture.]

Required Courses (General).

2. NURSERY PRACTICE. — This course treats of the fundamental operations of horticulture — propagation, pruning, cultivation — as related to the physiology of the plant. Lectures and practicums; Bailey's "Nursery Book" as text in propagation. Sophomores; 2 hours. Credit, 2. Mr. NORMAN.

Elective Courses (General).

3. PLANT MATERIALS. — This course aims to make the students familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them. Prerequisite, Horticulture 2; 2 lecture periods and 1 laboratory period. Credit, 3. Professor WHITE.

4. PLANT MATERIALS. — A continuation of Course 3, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions. Prerequisite, Horticulture 3; 2 lecture periods and 1 laboratory period. Credit, 3. Professor WHITE.

6. PLANT BREEDING. — This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops. Seniors and graduates; open only to students well prepared in agricultural or horticultural subjects; 2 lecture periods and 1 two-hour laboratory period. [Not given in 1912–13.] Credit, 3.

FLORICULTURE.

Professor White.

Elective Courses.

1. Greenhouse Management. — This course is designed to familiarize students with methods followed in the management of greenhouse crops. The students are instructed in the practical operation of glazing concrete, bench construction, bulb culture, greenhouse watering, fumigating and ventilating, in the care of furnaces, and in the methods of propagation of greenhouse plants by seeds, cuttings, budding and grafting. This is designed as a laboratory course, and students electing it will be expected to arrange their hours according to the needs of the work. Prerequisite, Horticulture 2. Juniors; 7 hours a week. Credit, 4.
Professor White.

2. Greenhouse Design and Construction. — A continuation of Course 1, including also a study of the location, arrangement and construction of greenhouses; the drawing of plans for commercial and private ranges, to show foundations and details in construction of superstructure; arrangement of heating pipes; estimates of comparative cost of different methods of construction; drafting specifications. Juniors; prerequisite, Floriculture 1; 7 hours. Credit, 4.
Professor White.

3. Fall Greenhouse Crops. — A study of important fall and winter crops and their care, — chrysanthemums, carnations, violets, roses, palms, and the like; the importation, purchase and growth of bulbous material; the preparation of material for forcing; design making; house and church decorating. Lectures, text-books and laboratory exercises. Prerequisites, Floriculture 1 and 2. Seniors; 5 hours. Credit, 3.
Professor White.

4. Spring Greenhouse Crops. — The culture of individual crops in their relation to spring work in a florist establishment. A critical study of methods of propagating bedding plants, the nature and use of these plants, practice in planting them and in the spring care of herbaceous perennials and wholesale and retail marketing of spring plants. Lectures, text-books and practical exercises. Seniors; prerequisites, Floriculture 1, 2 and 3; 5 hours. Credit, 3.
Professor White.

FORESTRY.

Associate Professor Moon, Mr. Rane.

Elective Courses.

1, 2. Dendrology and Silviculture. — These two subjects run parallel throughout the year. Under dendrology, the habits and needs of trees are studied, their distribution, soil and moisture requirements, growth, etc. Under silviculture are taken up the life history of trees and stands; tree characteristics, how modified; the concept of a forest and its subdivisions; methods of reproduction, both natural and artificial, with both theoretical and practical work in thinnings and nursery practice. Course 1 prerequisite to Course 2. Juniors; 3 lectures weekly, with 4 additional hours of optional field work. Credit, 3. Associate Professor Moon.

3, 4. Advanced Forestry. — Forestry 3 consists of an advanced course in forestry, in which forest economics, policy and law, forest mensuration, forest management and lumbering are taken up. Prerequisites, Forestry 1 and 2. Three lectures. Credit, 3.
Associate Professor Moon.

*5, *6. Silvics and Silviculture. — Courses consisting entirely in field work, running parallel with Forestry 3 and 4. Factors of site, silvical habits of trees, forest description and type mapping, reproduction, nursery practice, including the laying out of seed beds, forest mensuration and practical work in the various methods of making thinnings and reproduction cuttings. First given, 1912–13. Four hours. Credit, 2.
Associate Professor Moon.

LANDSCAPE GARDENING.

Professor Waugh, Mr. Harrison.

Elective Courses.

1. Elements of Landscape Gardening. — Reconnoissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected designs of leading landscape gardeners; grade design, road design and field work. Students should have preparation in surveying, mathematics, plant materials and drawing. Must be followed by Course 2. Juniors; 6 hours a week. Credit, 3. Mr. Harrison.

2. ELEMENTS OF LANDSCAPE GARDENING. — As stated under Course 1. Prerequisite, Course 1. Mr. HARRISON.

3. GENERAL DESIGN. — Field notes; examination of completed works and those under construction; design of architectural details, planting plans, gardens and parks and private grounds; written reports of individual problems. Seniors; prerequisite, Landscape Gardening 1 and 2, and either plant materials (Horticulture 3 and 4) or advanced mathematics; must be followed by Course 4; 6 hours. Credit, 3. Professor WAUGH.

4. GENERAL DESIGN. — As stated under Course 3. Prerequisite, Course 3. Professor WAUGH.

5. THEORY OF LANDSCAPE ART. — The general theory and applications of landscape study, including a brief history of the art. Seniors and graduates; 2 hours. Credit, 2.
Professor WAUGH.

6. ARCHITECTURE. — The history of architectural development, the different historic types, with special reference to the underlying principles of construction and design and their relations to landscape design. Illustrated lectures, conferences, practice in designing; 2 hours. Credit, 2. (Alternating with Course 10.)
Mr. HARRISON.

7. CIVIC ART. — The principles and applications of modern civic art, including city design, city improvement, village improvement and rural improvement. Prerequisites, Courses 1, 2 and 3; must be followed by Course 8; 6 hours. Credit, 3.
Professor WAUGH.

8. CIVIC ART. — As stated under Course 7. Prerequisite, Course 7. Professor WAUGH.

10. CONSTRUCTION AND MAINTENANCE. — Detailed instruction in methods of construction and planting in carrying out plans, in organization, reporting, accounting, estimating, etc.; maintenance work in parks and on estates, its organization, management, cost, etc. Two hours. Credit, 2. (Alternating with Course 6 and not to be given in 1912–13.) Mr. HARRISON.

MARKET GARDENING.

Assistant Professor Yeaw.

Elective Courses.

2. Elements of Market Gardening. — A course designed for an introduction to market gardening as a business. The work consists primarily of actual field experience in handling vegetable crops from seed to maturity. This is supplemented with lectures and text-book, in which a study of methods, soils, fertilization, tillage and management is made. Juniors; 5 hours. Credit, 3.
Assistant Professor Yeaw.

3. Advanced Market Gardening. — A continuation of the work begun in Market Gardening 2, taking up problems of seed growing, selection of varieties, crop management, harvesting, storage and marketing. A study is made of the greenhouse vegetable industry, and considerable time devoted to growing the special forced crops. Some time is given to a systematic study of vegetable description, classification and nomenclature. Collateral reading is required. Seniors; prerequisite, Market Gardening 2; 5 hours. Credit, 3. Assistant Professor Yeaw.

POMOLOGY.

Professor Sears, Mr. Norman, Mr. Rees.

Elective Courses.

1. Practical Pomology. — *General.* — A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of stock, pruning, spraying, etc. Text and reference books; field and laboratory exercises. Prerequisite, Horticulture 2. Juniors; 5 hours. Credit, 3. Professor Sears.

2. Practical Pomology. — *Special.* — The special application of the general principles discussed in Course 1 to the culture of the principal kinds of fruits, such as apples, pears, peaches, plums, cherries and quinces; grape culture and the culture of small fruits, such as blackberries, raspberries, currants, gooseberries and strawberries. Text-books, lectures and reference books; field and laboratory exercises. Prerequisites, Horticulture 2 and Pomology 1. Juniors; 5 hours. Credit, 3. Professor Sears.

3. Systematic Pomology. — A study of the varieties of the different fruits and of nomenclature, with critical descriptions;

special reference being given to relationships and classification. Text-books, laboratory and field exercises. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 5 hours. Credit, 3.
Professor SEARS.

4. COMMERCIAL POMOLOGY. — The storing and marketing of fruits; includes a discussion of storage houses, the handling and storing of fruits, fruit packages, methods of grading and packing, etc. Text and reference books; laboratory exercises. Seniors; prerequisites, Horticulture 2, Pomology 1, 2 and 3; 5 hours. Credit, 3.
Professor SEARS.

6. SPRAYING. — A study of (*a*) spraying materials, their composition, manufacture and preparation for use; the desirable and objectionable qualities of each material, formulas used, cost, tests of purity. (*b*) Spraying machinery, including all the principal types of pumps, nozzles, hose and vehicles; their structure and care. (*c*) Orchard methods in the application of the various materials used, with the important considerations for spraying each fruit and for combating each orchard pest. This course is designed especially to familiarize the student with the practical details of actual spraying work in the orchard. Spray materials are prepared, spraying apparatus is examined and tested, old pumps are overhauled and repaired, and the actual spraying is done in the college orchards and small fruit plantations. Prerequisites, Horticulture 2, Pomology 1 and 2. Seniors; 3 hours (1 lecture period and 1 laboratory period). Credit, 2.
Professor SEARS.

DRAWING.

Mr. HARRISON.

Elective Courses.

1. FREEHAND DRAWING. — Lettering; sketching from type models, leaves, fruits, vegetables, flowers and trees, insects and small animals; laying flat and graded washes in water colors; water-color rendering of fruits, vegetables, leaves, flowers and trees; topographical lettering and conventional signs in ink; conventional coloring; mapping in ink and in water colors. Juniors; 6 hours. Credit, 3. Mr. HARRISON.

2. MECHANICAL DRAWING. — Inking exercises; geometric problems; projection; intersections, isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Juniors; 6 hours. Credit, 3. Mr. HARRISON.

DIVISION OF SCIENCE.

Professor PAIGE.

BOTANY.

Professor STONE, Assistant Professor OSMUN, Mr. MCLAUGHLIN.

[The object of the courses in botany is to teach those topics pertaining to the science which have a bearing upon economic and scientific agriculture. Undergraduate work extending through five semesters is offered. Considerable latitude is allowed students in the senior year in their electives; and, besides the courses here outlined, students often take up the study of histology or of systematic botany, the microscopic examination of pure and adulterated human and cattle foods, spices and drugs, etc. Students sufficiently prepared are occasionally permitted to undertake special physiological and pathological investigations. A botanical conference is held monthly wherein new problems in botanical science are considered by graduate students and the seniors who elect botany.]

Required Courses.

2. HISTOLOGY, PHYSIOLOGY, MORPHOLOGY AND CLASSIFICATION OF PLANTS. — This course is divided into two parts: Part I. extends to the first week in May; Part II. occupies the remainder of the semester. Part I.: Devoted to study of the minute structure and the function of stems, leaves, roots and seeds, and of the chemical composition of plant constituents. The laboratory work consists largely of microscopic study of plant structures, with some time devoted to chemical tests for plant constituents. The lectures aim to amplify and interpret the laboratory work, and to explain the inter-relation of structure and function. Part II.: The laboratory periods are employed in the study of morphology and plant analysis. Lectures are given in morphology, ecology, evolution and taxonomy. Each student is required to collect and prepare an herbarium of 75 species of native plants. Gray's "New Manual of Botany" is used in determining and naming plants. Though only one lecture period is scheduled for this course, it is understood that laboratory hours may be used for lectures at the discretion of the instructor. Sophomores; 3 two-hour laboratory periods and 1 lecture hour. Credit, 4. Assistant Professor OSMUN.

Elective Courses.[1]

3. CRYPTOGAMIC BOTANY. — Systematic study of typical forms of the lower plants (bacteria, algæ, fungi, lichens, mosses and ferns); instruction in laboratory technique and methods, and the making of herbaria of lichens, mosses and ferns. Laboratory work and lectures; field excursions for the purpose of observing environmental habits and collecting material for laboratory study; collateral reading. This course is intended for those students who wish to specialize in biology; its purpose is to afford more thorough scientific training than is offered in Course 5, and students electing this course will attend the lectures in Course 5. Juniors; 3 two-hour laboratory periods and 1 lecture hour. Credit, 4.
Assistant Professor OSMUN.

4. CRYPTOGAMIC BOTANY. — This is a continuation of Course 3. Prerequisite, Course 3. Juniors; 1 two-hour laboratory period and 1 lecture hour. Credit, 2. Assistant Professor OSMUN.

5. PLANT PATHOLOGY. — This course comprises a study of the common diseases of crops and consideration of the methods for their prevention and control, and is intended especially for students in horticulture and agriculture. Laboratory work and lectures. The work in pathology is preceded by a brief study of the lower cryptogams. Juniors; 1 two-hour laboratory and 1 one-hour lecture period. Credit, 2.
Professor STONE and Assistant Professor OSMUN.

7. PLANT PATHOLOGY. — This course includes a study of the diseases of one or more crops and the methods of controlling them. Laboratory work and lectures, together with extensive reading of experiment station literature. The course is intended for those who wish to become more familiar with the diseases of one or more groups of economic plants. Seniors; those students continuing in botany must take Course 8; 3 three-hour laboratory periods and 1 lecture period. Credit, 5. Professor STONE.

8. PLANT PATHOLOGY. — As stated in Course 7. Prerequisite, Course 7. Professor STONE.

---

[1] Students electing any of the junior work may take botany in their senior year, and those specializing in chemistry may take plant physiology in their senior year without having had the junior work in botany.

9. ECONOMIC FUNGI. — This course comprises the study of economic fungi from a taxonomic point of view, and is intended for those who wish a more comprehensive knowledge of the phylogenetic relationships of fungi. Laboratory work and lectures. Tubeuf & Smith's "Diseases of Plants" is used as a guide, with special monographs on fungi and with the more important experiment station literature treating of the life history of fungi. Seniors; must be followed by Course 10; 2 or 3 three-hour laboratory periods and 1 one-hour lecture period. Credit, 4 or 5.
Professor STONE.

10. ECONOMIC FUNGI. — As stated in Course 9. Prerequisite, Course 9. Professor STONE.

11. PLANT PHYSIOLOGY. — This course is largely experimental, and is especially adapted to the needs of students who are taking chemistry. Laboratory work and lectures; various handbooks on plant physiology. Seniors; must be followed by Course 12; 3 three-hour laboratory periods and 1 one-hour lecture period. Credit, 5.
Professor STONE and Mr. MCLAUGHLIN.

12. PLANT PHYSIOLOGY. — As stated in Course 11. Prerequisite, Course 11. Professor STONE and Mr. MCLAUGHLIN.

13. PHYSIOLOGY AND PATHOLOGY OF SHADE TREES. — This course includes a comprehensive study of the diseases, structure and functions of trees and shrubs, and of every agency which in any way affects shade trees. Laboratory work and lectures; extensive reference reading. Designed for those students who intend to take charge of parks or large estates, or to become tree wardens, city foresters, landscape gardeners or professional advisers and caretakers. Seniors; must be followed by Course 14; 2 three-hour laboratory periods and 1 one-hour lecture period. Credit, 4.
Professor STONE.

14. PHYSIOLOGY AND PATHOLOGY OF SHADE TREES. — As stated in Course 13. Prerequisite, Course 13. Professor STONE.

GENERAL AND AGRICULTURAL CHEMISTRY.

Professor J. B. LINDSEY, Professor CHARLES WELLINGTON, Associate Professor JOSEPH S. CHAMBERLAIN, Assistant Professor CHARLES A. PETERS. Assistants, WILLIAM A. TURNER, HAROLD S. ADAMS.

[The course in chemistry aims to teach accurate observation, logical thinking and systematic and constant industry. It likewise aims to give those students following the several agricultural occupations, or who are preparing themselves for work as teachers and investigators in the other sciences, a knowledge of the subject sufficient to enable them to apply it in their various lines of work. Students taking all of the undergraduate courses and who intend following chemistry as a vocation are prepared for positions as instructors in high schools and colleges, in the agricultural experiment stations, the United States Department of Agriculture, as well as in the fertilizer, cattle food, sugar and dairy industries. Students are encouraged to take graduate work leading especially to the degree of M.Sc., and to thus prepare themselves for advanced positions as teachers in the agricultural colleges, as research chemists, and likewise for the more responsible positions connected with the different agricultural industries of the country. A fuller knowledge of the course of instruction will be found by consulting the following outline.[1]]

Required Courses.

1. GENERAL CHEMISTRY. — *The Non-metals.* — An introduction to the fundamental chemical laws, together with a study of the common acid-forming elements. Students presenting chemistry for entrance are given slightly different laboratory work. Kahlen-

---

[1] Changes have been made in the numbering and names of certain courses heretofore given as shown in the following table:

FORMER NUMBER AND NAME (CATALOGUE, 1910-11, WITH SUPPLEMENT).	NEW NUMBER AND NAME.
Course 3. — General chemistry.	*Course 3.* — Qualitative analysis.
Courses 9 and 10. — Quantitative analysis.	*Course 9.* — Quantitative analysis. Includes former 9 and 10.
Courses 17 and 18. — Chemical practice in agriculture.	*Courses 10 and 11.* — Agricultural chemical analysis.
Not given previously.	*Course 12.* — Special work in agricultural analysis.
Not given previously.	*Course 14.* — Special work in physiological and organic agricultural chemistry.
Not given previously.	*Course 15.* — Physical chemistry.
Not given previously.	*Course 16.* — Special work in physical chemistry.
Not given previously.	*Course 18.* — History of chemistry.

berg's "Outlines of Chemistry" is used as a text. Freshmen; lectures, 2 hours; laboratory, 2 hours. Credit, 3.
Assistant Professor Peters and Mr. Adams.

2. General Chemistry. — *The Metals.* — A continuation of Course 1. A study of the common metals used in the arts. The laboratory work takes the synthetic form, and the student prepares fewer substances in larger quantities. Sulfur and arsenic insecticides and superphosphates are made in addition to preparations outlined in Blanchard's "Synthetic Inorganic Chemistry." Freshmen; lectures, 2 hours; laboratory, 2 hours. Prerequisite, Course 1. Credit, 3. Assistant Professor Peters and Mr. Adams.

Elective Courses.

3. Qualitative Analysis. — *Basic.* — A course in the systematic analysis of metallic salts. Many of the processes used in exact analysis are studied here. Special attention is given to the treatment of colloidal solutions and to the application of the law of mass action. Designed for *sophomores* and should be taken by all intending to study chemistry further. Text, Gooch and Browning's "Outlines of Qualitative Analysis," with Treadwell-Hall's "Qualitative Analysis" for reference. Prerequisite, Course 2. First offered in 1912–13. Lecture, 1 hour; laboratory, 4 hours. Credit, 3. Assistant Professor Peters and Mr. Turner.

4. Qualitative Analysis. — *Acidic.* — A continuation of Course 3. Assistant Professor Peters and Mr. Turner.

5. Organic Chemistry. — This course, with Course 6, continues through the junior year. The two courses are designed especially: (1) for those who are looking forward to positions as chemists in agricultural colleges or experiment stations, the United States Department of Agriculture, or similar places, and who need a knowledge of chemistry for itself; and (2) for those who are expecting to enter like positions in other sciences, and who will use their knowledge of chemistry in a secondary way. It consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry. Especial attention is given to those compounds which are found in agricultural products or are manufactured from them. These include alcohols, acids, esters, fats, carbohydrates, proteins, etc. The work forms a foundation for courses in physiological chemistry

and agricultural analysis, and thus for future work in agricultural chemical investigation. Prerequisites, Courses 1, 2, 3 and 4. Juniors; those electing Course 5 are expected to elect Course 6. Lectures, 3 hours; laboratory, 4 hours. Credit, 5.
Associate Professor CHAMBERLAIN.

6. As stated under Course 5.
Associate Professor CHAMBERLAIN.

7. AGRICULTURAL CHEMISTRY. — This course and Course 8 are designed as an alternative for Courses 5 and 6. They are especially intended for those who, having completed Courses 1 and 2, do not care to continue the study of chemistry for itself, but are planning to enter practical agricultural work and desire a further knowledge of chemistry as it is related directly to agriculture and agricultural problems. The work is planned in two parts, viz.: *Course 7, Inorganic Agricultural Chemistry,* the study of the general composition, properties and reactions of soils and fertilizers, and in addition to this the study of some of the more important fungicides and insecticides, and the common materials of construction, such as tile, brick, cements, paints, oils, etc. *Course 8, Organic Agricultural Chemistry,* the study of the composition, physiological processes, uses and nutritive value of plants, and the composition and general processes of nutrition and growth of animals. Also, the study of products related to plants and animals, such as milk, butter, sugar, maple syrup, denatured alcohol, wood pulp, paper, etc. The treatment of the subject in both of these courses is entirely general, avoiding all complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the chemical aspect of agricultural processes and products. Prerequisites, Courses 1 and 2. Juniors; those electing Course 7 are expected to elect Course 8. Lectures, 2 hours; laboratory, 2 hours. Credit, 3. Associate Professor CHAMBERLAIN.

8. As stated under Course 7.
Associate Professor CHAMBERLAIN.

9. QUANTITATIVE ANALYSIS. — Instruction in this course includes the gravimetric and volumetric determinations of the commoner metals and non-metals in minerals, ores and industrial products. After closely following detailed methods of analysis, if time permits the student is directed in the discrimination between

various methods as to their accuracy and adaptability for special purposes. Talbot's "Quantitative Chemical Analysis" is used as a text. Prerequisite, Courses 1, 2, 3 and 4. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.

Professor Wellington and Mr. Turner.

10. Agricultural Chemical Analysis. — In this course and Course 11 the methods previously studied, and other approved methods which appear from time to time, are applied to the examination of agricultural materials. The analysis of fertilizers, insecticides, fungicides and soils is followed by that of cattle foods, dairy products, sugars, starches and allied substances. Prerequisite, Course 9. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5. Professor Wellington and Mr. Turner.

11. Agricultural Chemical Analysis. — As stated under Course 10. Prerequisite, Course 10. Seniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.

Professor Wellington and Mr. Turner.

13. Physiological Chemistry. — This course is intended to be supplementary to Courses 5 and 6 and Courses 7 and 8. To those who expect to take up scientific work, and who have had Courses 5 and 6, it will give acquaintance with the chemistry of the physiological processes in plants and animals, by means of which some of the important organic compounds studied in Courses 5 and 6 are built up in the living organism or are used as food by it. In the lectures the study of food and nutrition as related to both human and domestic animals is the principal subject. In the laboratory experimental studies are made of the animal body and the processes and products of digestion, secretion and excretion. The course gives additional training in the chemical problems of agricultural experiment station work, especially those connected with investigations in animal nutrition. To those who will not take up scientific lines of work, but will follow practical agriculture, it will give an opportunity for a more detailed study of the chemistry and physiology of problems which were treated generally in Courses 7 and 8. Prerequisites, Courses 5 and 6 or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor Chamberlain.

[*12, *14, *16. General Statement. — Each student electing either of these courses will be required to take up and follow out some special line of work, the object being to acquaint him with methods of original inquiry.

A single concrete example may be found in a comparative study of the different methods for the determination of the several forms of nitrogen. A thesis may not be required, but frequent consultation of the literature bearing on the subject will be necessary. These courses are valuable for all chemists, and particularly so for those intending to take up experiment station work. A student may choose any one but not two of these separate courses.]

*12. SPECIAL WORK IN AGRICULTURAL CHEMICAL ANALYSIS. — Topics for laboratory study will be assigned to each student. Prerequisite, Course 11. First offered in 1912–13. Seniors; laboratory, 10 hours. Credit, 5.

Professor WELLINGTON and Assistant.

*14. SPECIAL WORK IN PHYSIOLOGICAL AND ORGANIC AGRICULTURAL CHEMISTRY. — In this course, as in Courses 12 and 16, the student will be able to give his attention primarily to one line of chemical study. To those whose tastes and interests are in connection with the organic and physiological problems of agricultural chemistry, many subjects of study present themselves, among which may be mentioned: proteins, carbohydrates, fats, organic nitrogenous compounds in fertilizers and soils and their relation to plants, the commercial production of alcohol from agricultural products, digestion and dietary studies, etc. Prerequisite, Course 13. First offered in 1912–13. Seniors; laboratory, 10 hours. Credit, 5.

Associate Professor CHAMBERLAIN.

*16. SPECIAL WORK IN PHYSICAL CHEMISTRY. — Special topics of agricultural importance assigned to each student. Prerequisite, Course 15. First offered in 1912–13. Seniors; laboratory, 10 hours. Credit, 5.

15. PHYSICAL CHEMISTRY. — A résumé of general chemistry from the viewpoint of modern physical chemistry. Prerequisites, Courses 1, 2, 3, 4, 9 and 10. First offered in 1912–13. Seniors; lectures, 2 hours; laboratory 2 hours. Credit, 3.

18. HISTORY OF CHEMISTRY. — This will consist of an exposition of the development of chemical knowledge from the earliest times to the present. Although the entire history will be included, the larger portion of it will receive only brief mention in order that the questions of vital interest in modern life and industry may be studied at some length. More particular attention will be

given to the questions of plant and animal industry. Chemists are strongly advised to take this course. First offered in 1912–13. Seniors; lectures, 2 hours. Credit, 2.

Professor WELLINGTON.

ENTOMOLOGY.

Professor **FERNALD**, Associate Professor **CRAMPTON**, Assistant Professor **GATES**, Mr. **REGAN**, ———.

Elective Courses.

1. GENERAL AND ECONOMIC ENTOMOLOGY. — Course 1 comprises a general introduction to the study of insects, including studies on their structure as applied to their identification; the principles of classification; a systematic examination of the different groups and of the most important economic insects of each group, including their life histories and habits, recognition of their work as shown in the collections, and methods for their control. The most important insecticides and their preparation and application are also treated. Juniors; 3 lecture periods. Students electing Course 1 must also take Course 2. Credit, 3.

Professor FERNALD.

2. GENERAL AND ECONOMIC ENTOMOLOGY. — A continuation of Course 1, with laboratory and field work on methods of collecting, preserving and studying insects and their work. Juniors; 2 laboratory or field periods. Credit, 3. Professor FERNALD.

3. ADVANCED ENTOMOLOGY. — This course is subdivided, the time spent on the various subdivisions differing somewhat according to the particular needs of those taking it, and is to a large degree given in the form of individual instruction.

A. Morphology. — Careful studies of the structure of insects belonging to each of the larger and more important orders, together with lectures on the subject, followed by the identification of insects of each of these groups and the study of the collections, to teach the use of the analytical tables and of structural characters in the determination of insects.

B. Histology. — Lectures on the internal anatomy and histology of the various organs, with particular reference to those affected by the various insecticides.

C. Insecticides and Apparatus. — Lectures on the chemistry, preparation and application of the different insecticides, their merits and defects; tests for detecting adulterations; and a study of other methods of insect control, together with laboratory work.

D. Coccidology. — Laboratory work on methods of preserving, mounting and identifying scale insects, particular attention being given to those of greatest economic importance.

E. Bibliography. — Studies of the various entomological publications and of the methods of finding the literature on any insect.

F. Special Studies. — In these studies the insects most closely related to the future occupation of the student will receive attention. The results of these studies are brought together in the form of an essay or thesis; this will include all the essentials of what is known of the life history, habits and injuries caused by each insect studied, together with methods of treatment, and a list of the best articles found in the course of the work. Comstock's "Manual for the Study of Insects" is used in the laboratory work. Seniors; prerequisite, Entomology 2; students electing 3 must also take 4; 1 one-hour lecture period and 3 two-hour laboratory or field periods. Credit, 4.

Professor FERNALD, Associate Professor CRAMPTON,
MR. REGAN and ————————

4. ADVANCED ENTOMOLOGY. — As stated in Course 3. Prerequisite, Course 3.

5. FOREST INSECTS. — A study of insects injurious to forest trees and of methods for their control, with laboratory and field work on these insects, and a study of what has been published about them. Seniors; prerequisites, Entomology 1 and 2. One lecture and 2 two-hour laboratory or field exercises. Credit, 3.

Professor FERNALD.

8. BEEKEEPING. — This course comprises a general consideration of the biology of the honey bee and of practical beekeeping. Some topics covered are: phylogeny, life history, general behavior and instincts, structure, products, relations of bees to plants and the honey flora. The course aims particularly to afford first-hand, practical experience with bees, to the end of enabling their proper maintenance for any purpose, horticultural, educational or apicultural. Bee diseases, a thorough understanding of which is fundamental to the industry, are considered. So far as possible the work is made individual in constructing materials and apparatus.

Juniors; Seniors may elect. Courses 1 and 2 form a desirable preparation; 2 lectures; 1 two-hour laboratory period. Credit, 3.

Assistant Professor GATES.

*10. ADVANCED BEEKEEPING. — A course in advanced beekeeping will probably be offered in 1912–13.

MATHEMATICS AND CIVIL ENGINEERING.

Professor OSTRANDER, Mr. DUNCAN, Mr. MACHMER, Mr. PARSONS.

Required Courses.

1. HIGHER ALGEBRA. — A brief review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Reitz and Crathorne's "College Algebra." Freshmen; 3 hours a week. Credit, 3.

Mr. MACHMER and Mr. PARSONS.

2. HIGHER ALGEBRA. — As stated under Course 1.

Mr. MACHMER.

3. SOLID GEOMETRY. — Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Wentworth and Smith's "Solid Geometry." Freshmen; required unless accepted for admission; 2 hours a week. Credit, 2.

Mr. DUNCAN.

4. PLANE TRIGONOMETRY (in Charge of Department of Physics). — The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry." Required unless accepted for admission. Freshmen; 3 hours. Credit, 3.

Professor HASBROUCK and Captain MARTIN.

Elective Courses.

6.[1] PLANE SURVEYING. — The elements of the subject, including the adjustment and use of the usual instruments. Text-book and lectures. Sophomores; 6 hours a week. Credit, 3.
Mr. DUNCAN and Mr. PARSONS.

7. ANALYTIC GEOMETRY. — A discussion of the geometry of the line, the circle, of conic sections and of the higher plane curves. Fine and Thompson's "Coördinate Geometry." Prerequisites, Mathematics 1, 2, 3 and 4; 3 hours a week. Credit, 3.
Professor OSTRANDER.

8.[1] DIFFERENTIAL AND INTEGRAL CALCULUS. — A first course in the subject, with some of the more important applications. Nichol's "Differential and Integral Calculus." Prerequisites, Mathematics 1, 2, 3, 4 and 7; 5 hours. Credit, 5.
Professor OSTRANDER.

10.[1] ADVANCED SURVEYING. — Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. [Not given in 1912–13.] Text-book and lectures; 6 hours. Credit, 5. Professor OSTRANDER.

11. HYDRAULICS AND SANITARY ENGINEERING. — Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. [Not given in 1912–13.] Text-book and lectures; 3 hours. Credit, 3.
Professor OSTRANDER.

12.[1] ELEMENTARY STRUCTURES. — An elementary course in roof and bridge stresses. Text-book and lectures; 4 hours. Not given in 1911–12. Credit, 3. Professor OSTRANDER.

13.[1] MATERIALS OF CONSTRUCTION, FOUNDATIONS AND MASONRY CONSTRUCTION. — Text-book and lectures; 5 hours. Not given in 1911–12. Credit, 5. Professor OSTRANDER.

15. APPLIED MECHANICS. — A course in applied mechanics, based on the calculus, with problems. Text-books and lectures. Prerequisites, Mathematics 7, 10; 3 hours. Credit, 3.
Professor OSTRANDER.

---

[1] Courses here numbered 6, 8, 10, 12, 13 and 14 were numbered 8, 10, 12, 13 and 17 respectively in the previous catalog.

14.[1] DESCRIPTIVE GEOMETRY. — An elementary course; given only in 1911–12; 5 hours. Credit, 3. Professor OSTRANDER.

PHYSICS.

Professor HASBROUCK, Captain MARTIN, Mr. BUTMAN.

[The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry, zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.]

Required Courses.

1. GENERAL PHYSICS. — General physics covers mechanics of solids, mechanics of fluids, wave motion and heat. These topics are chosen for the required work because they are regarded as the most fundamental of all, and there is no part of the work in physics more necessary for the student who plans to take up practical farming. Course given by text-book and lectures. Sophomores; 4 hours' class-room work and 1 laboratory period. Credit, 5.
Professor HASBROUCK and Mr. BUTMAN.

Elective Courses.

2. GENERAL PHYSICS. — Electricity and light. Text-book, lectures, recitations and laboratory work. Sophomores; 2 hours of class-room work and 1 laboratory period. Credit, 3.
Mr. BUTMAN.

3. OPTICAL INSTRUMENTS AND LIGHT. — Three-hour lecture course open to juniors and seniors; 3 hours. Credit, 3.
Mr. BUTMAN.

4. ELECTRICITY AND HEAT. — Three-hour lecture and laboratory course open to juniors and seniors; 3 hours. Credit, 3.
Mr. BUTMAN.

[Mathematics 4 (trigonometry) is, for convenience of grouping, listed under Mathematics, although in charge of the Department of Physics.]

---

[1] Courses here numbered 6, 8, 10, 12, 13 and 14 were numbered 8, 10, 12, 13, 14 and 17 respectively in the previous catalog.

VETERINARY SCIENCE.

Professor PAIGE, Assistant Professor GAGE.

[The courses in veterinary science have been arranged to meet the needs of students who purpose following practical agriculture, and of prospective students of human and comparative medicine.]

Elective Courses.

1. INTRODUCTORY BACTERIOLOGY. — The object of this course is to acquaint the student with the various organisms found in air, water, soil, milk and the body, and with the relation of these organisms to such processes as decomposition, fermentation and digestion, and to the production of disease. Toxic substances resulting from the growth of organisms, and the antitoxins used to counteract their action, are considered. Lectures, recitations and laboratory work. Seniors; 3 two-hour laboratory exercises. Credit, 3. Professor PAIGE and Assistant Professor GAGE.

2. BACTERIOLOGY. — A continuation of Course 1, taking up more advanced problems.
Professor PAIGE and Assistant Professor GAGE.

3. VETERINARY SCIENCE. — A course treating of veterinary hygiene, comparative anatomy and general pathology; veterinary materia medica and therapeutics; the theory and practice of veterinary medicine; general, special and operative surgery; and veterinary bacteriology and parasitology. Lectures, clinics, demonstrations and laboratory exercises. Must be followed by Course 4. Seniors; 5 hours. Credit, 5. Professor PAIGE.

4. VETERINARY SCIENCE. — As stated under Course 3.
Professor PAIGE.

ZOÖLOGY AND GEOLOGY.

Assistant Professor GORDON, Mr. MCLAINE.

ZOÖLOGY.

Required Courses.

1. ELEMENTARY ZOÖLOGY. — This course in a general way constitutes the zoölogical part of an introductory course in biology. Laboratory dissection and lectures; laboratory text, Drew's "Invertebrate Zoölogy." Sophomores; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

Elective Courses.

3. INVERTEBRATE ZOÖLOGY. — This course does not include the insects. Economic zoölogy. Text-books, Parker & Haswell's "Textbook of Zoölogy," Vol. I., and Drew's "Invertebrate Zoölogy." Prerequisite, Course 1 or its equivalent. Must be followed by Course 4. Juniors; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

4. VERTEBRATE ZOÖLOGY. — Text-book, Parker & Haswell's "Textbook of Zoölogy," Vol. II. Prerequisite, Course 3. Juniors; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3.
Assistant Professor GORDON.

5. ANIMAL PARASITES. — A survey of this special field of zoölogy. Laboratory and lecture work, with outside reading. Laboratory technique. Seniors; not open to fewer than 3 students. Prerequisites, Courses 1, 3 and 4. Three two-hour periods, 2 one-hour periods. Credit, 5. Assistant Professor GORDON.

6. ANIMAL PARASITES. — A continuation of Course 5. Two two-hour periods, 1 one-hour period. Credit, 3.

GRADUATE COURSES. — See "Graduate School."
Assistant Professor GORDON.

GEOLOGY.

Elective Courses.

2. GENERAL GEOLOGY. — Rock-forming minerals; rock types; dynamical, structural and surface geology. Lectures, map and field work. Sophomores; 1 two-hour laboratory period and 2 lecture periods. Credit, 3. Assistant Professor GORDON.

DIVISION OF THE HUMANITIES.

Professor SPRAGUE.

ECONOMICS AND SOCIOLOGY.

Professor SPRAGUE.

Required Course.

1. POLITICAL ECONOMY. — An introductory course. A study of the nature and scope of economics; the evolution and organization of the present economic system, the principles of production, exchange and consumption. This course will take up such topics as value, rentals, population, labor and its problems, capital, interest and profits, systems and factors of production, tariffs and commerce. Students will be called upon to analyze industrial plants in actual operation. Text-books, lectures and general discussions; a required course, but it may be taken in either junior or senior year; 3 hours. Credit, 3. Professor SPRAGUE.

Elective Courses.

2. INDUSTRIAL PROBLEMS. — A course in the most important industrial problems of the day, covering the methods of organizations of labor and capital, systems of industrial remuneration, means of securing industrial peace, legal status of labor unions and their activities, protective legislation for workmen and employers, the problems of immigration, the sweated industries, prison labor, child labor and industrial education. Text-book, with collateral readings, lectures and discussions; 3 hours. Credit, 3.
Professor SPRAGUE.

3. SOCIAL INSTITUTIONS AND SOCIAL PROBLEMS. — This course is devoted to the study of the social institutions, such as the family, the church, State and property; and to such current social problems as divorces, race suicide, crime and prison reform, poverty and its relief, social effects of low wages, child labor, overwork, immigration and congestion of population. The later weeks of the semester will be given to a short introduction to sociological theory. The correctional and charitable institutions of Massachusetts will be studied in considerable detail. Readings, lectures, papers; 3 hours. Credit, 3. Professor SPRAGUE.

4. Modern Social Reform Movements. — The history of property and its vital issues in modern times. The socialistic systems, anarchy and communism. Systems of workingmen's insurance in Europe and America, and other methods of relief from the chances of life. Educational reforms, in process, to meet the demands of a new age, and legislative remedies for the evils of social change and maladjustment. The crisis of Christianity under modern capitalized industrialism. These topics indicate the nature of the subjects studied. This course follows Economics 3. Three hours. Credit, 3. Professor Sprague.

5. Public Finance, Money and Banking. — This course follows Economics 1. It will take up taxation and the various systems for collecting public revenue in Europe and America, with the problems involved; the history of money and the systems of banking and finance now in operation; the causes and problems of economic crises and depressions; the currency problems of the United States. Readings, lectures and discussions; 3 hours. Credit, 3. Professor Sprague.

6. Economic History. — This course will be divided between the economic history of Europe and that of America. An outline history will be followed with special study of selected epochal periods and important topics. Three hours. Credit, 3. Professor Sprague.

8. Anthropology; the History of Human Civilization. — The evolutionary origin and history of man; characteristics of primitive men, departure from the animal status, and the beginnings of civilization; development of industries, arts and sciences; the growth of languages, warfare, migrations and social institutions; a study of the powerful natural and human forces that have brought man from the early stages to modern conditions, will constitute the subject matter of the course. Three hours. Credit, 3. Professor Sprague.

HISTORY AND GOVERNMENT.

Associate Professor Eyerly, Mr. Holcomb.

Elective Courses.

1. Elements of Political Science. — Nature and scope of political science; origin and evolution of the State; systems of government in the principal European States; organization and work-

ing of the national and of the State governments of the United States; relation of government to political parties and to public opinion; the functions of government as related to labor and commerce. Three hours. Credit, 3.

Associate Professor EYERLY.

2. LOCAL POLITICAL INSTITUTIONS. — A comparative study of the organization, functions and achievements of country and city groups, especially as these are concerned with such matters as taxation, finance, licenses, franchises, public ownership, highways, transportation and communication, water supply, fire protection, public lighting, markets, food inspection, garbage and sewage disposal, infectious diseases, housing conditions, police force, parks and playgrounds, libraries, schools, care of dependents. Three hours. Credit, 3. Associate Professor EYERLY.

3. THE HISTORY OF NEW ENGLAND. — In this course, New England is regarded as a unit. Although the history of agriculture and rural life is treated with special fulness, ample attention is given to political, religious and ethical history. It is hoped that the student will not only be led to an intelligent understanding of present economic conditions, but will also be imbued with a progressive loyalty to the highest ideals of the New England of the past. Lectures and required reading; 3 hours. Credit, 3.

Mr. HOLCOMB.

5. THE HISTORY OF IDEALS. — This course treats history from the idealistic rather than from the economic, point of view. It attempts to define the great ideals which have impelled some of the most important social, political, esthetic, scientific, ethical and religious movements of medieval and modern history, and to trace the causes of the success or failure of the movements to which these ideals have led. Christianity, including monasticism, modern Catholicism and Protestantism; medieval art and architecture; the modern scientific movement; and social and political democracy will be treated historically from this point of view. Lectures and reading; 3 hours. Credit, 3. Mr. HOLCOMB.

LANGUAGES AND LITERATURE.

Professor Mills.

LANGUAGES AND LITERATURE: ENGLISH, JOURNALISM AND PUBLIC SPEAKING.

Associate Professor Neal, Assistant Professor Lewis, Mr. Wattles, Mr. Widger, Miss Goessmann.

Required Courses.

1, 2. Freshman English. — Composition; introduction to literature. Recitations, laboratory practice and lectures; theme writing; conferences. Text-book and laboratory manual, Neal's "Thought Building in Composition." Freshmen; 4 hours. Credit, 4.

Associate Professor Neal, Mr. Wattles, Mr. Widger and Miss Goessmann.

3. Sophomore English.[1] — Composition; literature. Prerequisite, Course 2; sophomores; 2 hours. Credit, 2.

Assistant Professor Lewis and Mr. Wattles.

4. Sophomore English.[1] — As stated under Course 3. Prerequisite, Course 3. Mr. Wattles and Miss Goessmann.

Elective Courses in English Language and Journalism.

7. Expository Writing.[2] — The principles of exposition, with exercises in composition. Subjects will be largely found in current events and contemporary thought, and treated editorially. A foundation course in more advanced composition, primarily for juniors but open to seniors. [Not offered in 1912–13.] Two hours, with a third hour at the option of the instructor. Credit, 2. ————————

8. Expository Writing.[2] — The principles of exposition with especial reference to technical writing, including the writing of bulletins; some attention also to the more popular exposition of scientific facts. Primarily for juniors but open to seniors. [Not offered in 1912–13.] Two hours, with a third hour at the option of the instructor. Credit, 2. ————————

---

[1] The rule that "students whose work in Courses 1, 2, and 3 reaches a standard satisfactory to the Department may be excused from not more than half of the sophomore work in English," has been repealed by faculty vote.

[2] These courses are to be substituted for the courses previously given under the same numbers as Composition Training Courses.

9, 10. RURAL JOURNALISM. — The courses in journalism aim to acquaint the student with the elementary problems and theory of journalism as a profession or vocation, and to exercise him, as far as conditions permit, in the commoner aspects of journalistic work, such as news-gathering, news-writing, desk-editing and editorial writing. By rural journalism is meant merely the application of journalistic principles in getting and suitably presenting material adapted to the non-urban rather than to the urban or metropolitan reader, so far as their interests are distinct. This includes agricultural journalism, but is by no means confined to that. Professional ideals are regarded as being practically involved in all parts of the work undertaken. Members of the classes have this year been supplying, under the head "The Bay State Ruralist," a feature page for the "Springfield Sunday Union." Members of all classes turn in copy regularly for publication or other disposition, as the instructor may determine, and must have free time for covering stories. Students wishing to proceed beyond elementary study are urged to consult with the instructor before making their election of subjects for the junior-senior years, in order that the most helpful program of work may be arranged.

9*A*. *Introduction to Journalism.* — The foundation conceptions and aims of journalism; practice in the simple forms of journalistic writing. Prerequisite to all other work in journalism, and valuable also to students preparing for practical farming, agricultural or general science, rural education, etc., as a vocation. [Heretofore given as 9*B*.] Two hours, with a third hour at option of the instructor. Credit, 2. Associate Professor NEAL.

9*B*. *Journalistic Practice.* — The gathering and preparation of material for publication. The class may be organized as a staff. Prerequisite, 9*A* or its equivalent. [Heretofore given as 9*A*, Agricultural Journalism. Omitted in 1911–12.] Two hours, with a third hour at the option of the instructor. Credit, 2.

Associate Professor NEAL.

9*C*. *Advanced Journalistic Practice.* — Informal; students will be assigned work as editorial assistants or writers, or otherwise employed in some form of journalistic activity. Study of particular forms of journalistic writing, of special subjects and their journalistic presentation, of particular kinds of periodical, or of

current topics, may be directed, and the presentation of a thesis may be required. Hours to be arranged. Two hours. Credit, 1.
Associate Professor Neal.

10*A*. *Reporting.* — News-gathering and news-writing. This includes the gathering and presentation of industrial and agricultural information, campus news or other stories, as may be directed. Courses 9*A* and 10*A* are the foundation courses in journalism. Students admitted to 10*A* who have not had 9*A* will be required to do extra work. Two hours, with a third hour at the option of the instructor. Credit, 2. Associate Professor Neal.

10*B*. *Journalistic Practice.* — As stated under 9*B*.

10*C*. *Advanced Journalistic Practice.* — As stated under 9*C*.

17. ADVANCED COMPOSITION AND LITERATURE. — The reading and study of writings that are typical of literary style or form, especially in description and narration, and the writing of exercises involving problems of the same general cost as those illustrated by the readings. A good deal of fiction will probably be read, of which more or less will be found in the novels and short stories of our own day. On this study will be based the work in composition. Primarily for seniors but open to juniors. [Not given in 1911–12.] Two hours, with a third hour at the option of the instructor. Credit, 2. Associate Professor Neal.

Elective Courses in Literature.

9, 10. CULTURAL READING. — The substitution of other work for these courses is probable. Associate Professor Neal.

13. ENGLISH WRITERS AND THOUGHT. — Studies, laboratory problems, readings, and reports in some period of English literature. In 1911–12, Chaucer to the sixteenth century. Three hours. Credit, 3. Associate Professor Neal.

14. ENGLISH WRITERS AND THOUGHT. — As in Course 13. In 1911–12, the sixteenth century to Shakspere. Three hours. Credit, 3. Associate Professor Neal.

15. ENGLISH LANGUAGE AND LITERATURE. — The origin, history and development of the English language; essayists and novelists of the nineteenth century. Continuous with Course 16. Three hours. Credit, 3. Assistant Professor Lewis.

16. ENGLISH LANGUAGE AND LITERATURE. — Continuous with Course 15. The elements of literary criticism; nineteenth century poets. Three hours. Credit, 3. Assistant Professor LEWIS.

18. ADVANCED LITERATURE. — This course varies from year to year. It will usually provide opportunity either for intensive study of great writers or for study of the historical development or the structure and characteristics of literary types; in 1911–12, Tennyson. Three hours. Credit, 3. Associate Professor NEAL.

Required Courses (Public Speaking).

1. FRESHMAN PUBLIC SPEAKING. — Freshman public speaking is required in either the first or the second semester, at the option of the instructor. Voice exercises; practice in the delivery of declamations and interpretive readings. Freshmen; 1 hour. Credit, 1. Mr. WIDGER.

2. FRESHMAN PUBLIC SPEAKING. — As stated under Course 1. Required of all freshmen who are not assigned to take Course 1. Mr. WIDGER.

Elective Courses.

*8. ORATORY.[1] — Speeches on assigned topics; prescribed reading; the preparation and delivery of an oration, supplemented by a study of the principles of oratorical composition and delivery. It is especially recommended for those who desire to enter the Flint contest. Prerequisite, Course 3; 1 hour. Credit, 1. Mr. WIDGER.

9. DEBATING. — Considerable time is given to the study of argumentation and brief-drawing. The class is divided into teams for the platform discussion of leading questions of the day. This course is designed to develop readiness in extempore speaking. It is recommended for those who desire to enter the intercollegiate debates. Prerequisite, Course 3; 2 hours. Credit, 2. Mr. WIDGER.

10. DRAMATIC READING.[1] — Exercises for voice and gesture; a study of the elements of vocal expression and action; expressional reading of selections in prose and poetry; presentation of scenes from plays. Prerequisite, Course 3; 1 hour. Credit, 1. Mr. WIDGER.

---

[1] It is expected that Courses 8 and 10 will be combined into a 2-hour course as Occasional Oratory.

LANGUAGES AND LITERATURE: GERMAN.

Assistant Professor ASHLEY, Mr. JULIAN.

Required Courses.

1. ELEMENTARY GERMAN. — Grammar and composition; the reading of short stories, poems, plays, etc. Especial attention is given to oral questioning and answering in German, and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Mr. JULIAN.

2. ELEMENTARY GERMAN. — As stated under Course 1. Prerequisite, Course 1. Mr. JULIAN.

3. INTERMEDIATE GERMAN. — Rapid reading of selected works from Schiller, Goethe, Lessing and others; review of grammar and dictation in German; outside readings. Required of freshmen who present German for entrance and do not take French. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Assistant Professor ASHLEY.

3A. INTERMEDIATE GERMAN. — Rapid reading of prose works, such as Sudermann's "Frau Sorge," and dramas, such as "Wilhelm Tell" and "Die Journalisten." Required of sophomores who took Courses 1 and 2 as freshmen. Mr. JULIAN.

4. INTERMEDIATE GERMAN. — As stated under Course 3. Prerequisite, Course 3. Assistant Professor ASHLEY.

4A. INTERMEDIATE GERMAN. — As stated under Course 3A. Open to students who have completed German 3A; 3 hours. Credit, 3. Mr. JULIAN.

5. ADVANCED GERMAN. — Literary study of the classicists, — Schiller's "Wallenstein," Lessing's "Nathan der Weise," Goethe's "Iphigenia," etc.; collateral readings in German and class-room reports. Conducted in German. Prerequisite, Course 4. Sophomores; required of those who took German 3 and 4 as freshmen; open upon arrangement to other students; 3 hours. Credit, 3. Assistant Professor ASHLEY.

Elective Courses.

6. Advanced German. — As stated under Course 5. Sophomores; open upon arrangement to other students. Prerequisite, Course 5; 3 hours. Credit, 3. Assistant Professor Ashley.

7. Modern German. — Reading of articles from the best modern German periodicals, such as "Ueber Land und Meer;" conversation and composition work based on text. "Ferien in Deutschland," prepared by instructor; 3 hours. Credit, 3.
Assistant Professor Ashley.

8. Modern German. — As stated under Course 7.
Assistant Professor Ashley.

9. Scientific German. — Reading of modern magazine articles and works in German of a scientific nature. Different work assigned according to needs of individual students. Open to juniors who have completed Course 4A or more advanced work. Three hours. Credit, 3. Assistant Professor Ashley.

10. Scientific German. — As stated under Course 9.
Assistant Professor Ashley.

11. German Literature. — Advanced language and literary study. Conducted entirely in German. Lectures on German literature and history; life, customs and travel in Germany. Collateral readings, including masterpieces of different epochs, such as "Niebelungenlied," Goethe's "Faust," and one modern typical drama. Prerequisite, Course 6 or 10.
Assistant Professor Ashley.

12. German Literature. — As stated under Course 11.
Assistant Professor Ashley.

LANGUAGES AND LITERATURE: FRENCH.

Assistant Professor Mackimmie, Mr. Harmount.

Required Courses.

1. Elementary French. — A beginning course. Thieme and Effinger's "French Grammar;" reader; graduated texts. Required of freshmen presenting German for entrance who do not continue that language and have not studied French; open upon arrangement to other students. Freshmen; 4 hours. Credit, 4.
Mr. Harmount.

2. Elementary French. — As stated under Course 1. Prerequisite, Course 1. Mr. Harmount.

3. Intermediate French (third year). — Training for rapid reading; the reading of a number of standard novels and plays; composition; reports on collateral reading from periodicals and scientific texts in the library. Required of freshmen who present two years of French for entrance and do not take German, and of sophomores who take Courses 1 and 2 as freshmen; open upon arrangement to other students; 4 hours. Credit, 4.
Assistant Professor Mackimmie, Mr. Harmount.

4. Intermediate French. — As stated under Course 3, but not required of sophomores who take Courses 1 and 2 as freshmen. Prerequisite, Course 3. Assistant Professor Mackimmie.

5. Advanced French (fourth year). — A reading course; representative masterpieces of the nineteenth century; collateral reading and written reports. Required of sophomores who take Courses 3 and 4 as freshmen; open upon arrangement to other students. Prerequisite, Course 4; 3 hours. Credit, 3.
Assistant Professor Mackimmie.

Elective Courses.

6. Advanced French (fourth year). — A general view of the history of French literature. Several plays of the great classical dramatists will be read. Prerequisite, Course 5. Sophomores; open upon arrangement to other students; 3 hours. Credit, 3.
Assistant Professor Mackimmie.

7, 8. Scientific French. — This course is intended to continue and enlarge the scientific readings begun in the freshman and sophomore years. It will consist of the reading of a scientific reader, outside readings and reports, and the careful reading of some recent work or series of articles in the subject in which the student is taking his major. Prerequisite, the required French or its equivalent. Intended principally for juniors. Three hours. Credit, 3. Mr. Harmount.

9, 10. French Literature from 1852. — The outline is intended as a suggestion. The exact subject-matter of the course will be determined when the men are enrolled. The object of this course is to give an introduction to the movements of French literature in the past fifty years. In the drama readings from Augier, A. Dumas, fils, Delavigne; in the novel from Flaubert, the de Goncourts, Zola; in criticism from Taine, Renan and Sainte Beuve; for the literary history of the period Lanson's Histoire de la litterature française. Prerequisite, the required French. Juniors or seniors; 3 hours. Credit, 3.

Assistant Professor MACKIMMIE.

LANGUAGES AND LITERATURE: SPANISH.

Assistant Professor MACKIMMIE.

Elective Courses.

1. ELEMENTARY SPANISH. — Grammar, with special drill in pronunciation; reading from a simple reader. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.

Assistant Professor MACKIMMIE.

2. MODERN SPANISH AUTHORS. — Reading from modern Spanish novel and drama. Prerequisite, Course 1. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.

Assistant Professor MACKIMMIE.

LANGUAGES AND LITERATURE: MUSIC.

Assistant Professor ASHLEY.

Elective Courses.

1. HISTORY AND INTERPRETATION OF MUSIC. — History of music among the ancients; medieval religious and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school — Bach, Händel, Haydn, Gluck and Mozart. One hour. Credit, 1. Assistant Professor ASHLEY.

2. HISTORY AND INTERPRETATION OF MUSIC. — A continuation of Course 1. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera. The Modern school and Modern composers. One hour. Credit, 1. Assistant Professor ASHLEY.

DIVISION OF RURAL SOCIAL SCIENCE.

President Butterfield.

AGRICULTURAL ECONOMICS.

Assistant Professor Cance.

Required Courses.

2. Agricultural Industry and Resources. — A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions. Sophomores; 3 hours. Credit, 3. Assistant Professor Cance.

Elective Courses.

4. Elements of Agricultural Economics. — This course is designed to follow the required work in the elements of economics. It will consider the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; determination of price; speculation; problems of land tenure and land values; taxation of land values; farmers' organizations; the farmer and legislation; the maintenance of the social, political and economic status of the farmer; and the relation of the farmer to the State. Lectures, text, readings, topics and field work; 3 hours. Credit, 3. Assistant Professor Cance.

5. Historical and Comparative Agriculture. — A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on present conditions and the history of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, to show that the agriculture of any country is a distinct individual problem, and to ascertain the causes now working to effect agri-

cultural changes. Lectures, readings and library work. Seniors and juniors; open to other students upon arrangement; prerequisite, Course 4 or equivalent; 3 hours. Credit, 3.
Assistant Professor CANCE.

[6. CO-OPERATION IN AGRICULTURE. — The course contemplates a somewhat comprehensive view of the history, principles and business relations of agricultural organization for profit. (1) A survey of the development and progress, the methods and economic results, of the farmers' organizations and great co-operative movements in the past; (2) the phases of business organization of agriculture abroad, and the present aspects and tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers, and practical working plans for co-operative associations, as illustrated by the most advanced and prosperous business organizations and exchanges, with particular reference to the marketing of perishable products. Lectures, text, assigned reading and practical exercises; 2 hours. [Not given in 1912–13.] Credit, 2. Assistant Professor CANCE.]

7. PROBLEMS IN AGRICULTURAL ECONOMICS. — An advanced course for students desirous of studying more intensively some of the problems immediately affecting the welfare of the farmer and society. Some of the problems that may be studied are: land problems, — land tenure; size of farms; causes affecting land values; private property in land; taxation of farm values; special problems, — cost of producing farm products; farm labor in New England; immigration; shifting of the rural population. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest. Seniors and juniors; open upon arrangement to other students; enrollment subject to approval of instructor; 2 or 3 hours a week. Credit, 2 or 3. Assistant Professor CANCE.

8. THE AGRICULTURAL MARKET. — This course contemplates a fundamental study of the forces and conditions which determine the prices of farm products, and the mechanism, methods and problems concerned with transporting, storing and distributing them. Such topics as supply and demand, course of prices, transportation by freight, express and trolley, terminal facilities, the middleman system, speculation in agricultural products, protective legislation, the retail market, direct sales and the like will be taken up. The

characteristics and possibilities of the New England market will be given special attention. Lectures, readings, assigned studies and field work. [Not offered in 1913–14.] Juniors and seniors; 2 or 3 hours a week. Credit, 2 or 3. Assistant Professor CANCE.

9. SEMINAR. — Research in agricultural economics and history: New England agriculture to 1860. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged. Credit, 1. Assistant Professor CANCE.

10. SEMINAR. — As stated in Course 9.
Assistant Professor CANCE.

AGRICULTURAL EDUCATION.

Professor HART, Associate Professor MORTON.

Elective Courses.

1. MEANING OF EDUCATION (PSYCHOLOGY). — A study of the development, structure and function of the nervous system with reference to the sense organs; relation of mind to the nervous system; growth and nature of mental processes; the activities of the mind in the process of learning. Text-book, lectures, discussion, and collateral readings and reports; 3 hours. Credit, 3.
Professor HART.

2. VOCATIONAL EDUCATION (HISTORY AND PHILOSOPHY). — A survey of educational, religious and social movements with reference to their vocational aspects; the growth of educational institutions as influenced by science and industry. Lectures, collateral readings, reports, and a thesis on some phase of industrial education; 3 hours. Credit, 3. Professor HART.

3. RURAL SCHOOL PROBLEMS. — A study of mental growth; the theory and practice of teaching; school organization and methods of instruction; the place and function of agriculture in the course of study. Primarily for those who have had Course 1 or 2; 2 hours. Credit, 2. Professor HART.

4. RURAL SCHOOL PROBLEMS. — Designed primarily for those who intend to teach; may be taken in connection with Course 3. The work consists of the selection and review of such parts of the courses in agriculture, horticulture and the biological and physical

sciences as are adapted to the work of the public schools; planning, and practical work in school gardens; decoration of school grounds; equipment and conduct of playgrounds. One lecture period, 2 two-hour laboratory periods. Credit, 3.
Professor HART, Associate Professor MORTON.

5. SEMINAR IN EDUCATION. — For students who have had courses 1, 2 and 3, or an equivalent. Topics that may be taken up for rather exhaustive study are: rural school supervision, and rural school surveys, etc. Seniors and graduate students; 2 hours. Credit, 2. Professor HART.

6. SEMINAR IN EDUCATION. — As stated under Course 5.
Professor HART.

RURAL SOCIOLOGY.

Associate Professor EYERLY, President BUTTERFIELD, Professor HART, Mr. HOLCOMB.

Elective Courses.

2. THE RURAL COMMUNITY. — A broad survey of the field of rural sociology, including such topics as the movements of the rural population, the social conditions and life of rural people, the influence of rural life, the description of the various social institutions of the rural community, an analysis of the fundamental problems of rural life, and the means of developing and redirecting the life of the rural community. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3.
President BUTTERFIELD and Associate Professor EYERLY.

3. THE LITERATURE OF RURAL LIFE. — A critical and appreciative study of writers, both in prose and poetry, who have interpreted nature from the viewpoint of the lover of country life, and those who have idealized agriculture, horticulture and other rural pursuits, together with those who have upheld as an ideal the development of a rural environment in cities; 3 hours. Credit, 3.
Mr. HOLCOMB.

4. RURAL LAW. — The work of this course will cover such points as land titles, public roads, rights incident to ownership of live stock, contracts, commercial paper and distinctions between personal and real property. Text, written exercises, lectures, and class discussions; 1 hour. Credit, 1. Professor HART.

5. The Social Conditions of the Rural People. — Composition of the rural population; vital statistics; nature, extent and causes of diseases and accidents; health agencies of control; extent and causes of delinquency and dependency; conditions of temperance, of sexual morality and family integrity; child labor; woman's work and position; relation of employer to employee; standard of living; size of family; cultural ideals; community consciousness and activity; standards of business conduct and of political ethics; 3 hours. Credit, 3. Associate Professor Eyerly.

6. Sociological Aspects of Co-operation among Farmers. — An historical sketch of the origin, extent and success of co-operation among farmers in the various European countries and in the United States; personal qualities and social conditions necessary to successful co-operative endeavor; the various forms of co-operative organization viewed in their industrial, intellectual and moral aspects; the influence of co-operation on the farmer's individualism, conservatism, self-help, thrift, contentment and on agrarian legislation, scientific agriculture and farm labor; the relation of co-operation to neighborhood life, to community pride and loyalty, to further associated effort, to class stability, solidarity and status; the demand of co-operation for a new type of leadership; the relation of co-operation to socialism and the competitive system; 3 hours. Credit, 3. [Given in 1912–13; not given in 1913–14.]
Associate Professor Eyerly.

7. Rural Institutions. — A study of the organized agencies by which rural communities carry on their various forms of associated life; particularly a study of the ways by which the domestic, economic, cultural, religious and political institutions contribute to rural betterment. Special attention given to the rural family and the rural church; 3 hours. Credit, 3.
Associate Professor Eyerly.

8. The State and the Farmer. — A general survey of political organizations and movements among farmers in foreign countries and their influence in shaping agrarian legislation; the character, extent and results of foreign State aid to the farming class; political movements among farmers in the United States; "Granger" legislation; relation of the Department of Agriculture, State boards of agriculture, agricultural colleges and experiment stations, postal

system, railway commissions, highway commissions, public health agencies, etc., to rural welfare; 3 hours. Credit, 3.

Associate Professor EYERLY.

9. THE SOCIAL PSYCHOLOGY OF RURAL LIFE. — Characteristics of the rural mind; character of hereditary and environmental influences; nature and effects of face to face groups; psychological effects of isolation, relative security and freedom from strain; relation of contact with nature, of control over immediate environment, of family co-operation and of neighborhood life to self-control, self-expression, sympathy, service and leadership; nature and effects of fashion, conventionality and custom; character of discussion and public opinion, and their relation to class feeling and organization; relation of individualism, conservatism and homogeneity to crowd phenomena and progressive democracy; 3 hours. Credit, 3. Associate Professor EYERLY.

10. FARMERS' ORGANIZATIONS. — The history, purposes and achievements of the grange, the farmers' union, farmers' clubs, village improvement associations, boys' clubs, etc.; the nature, scope, methods and history of local, State and national associations formed about some farm product or special farm interest, *e.g.*, dairying, horticulture, stock breeding, forestry; their influence on "better farming, better business, better living;" their influence in forming a class consciousness and in shaping legislation; need of federation; 3 hours. Credit, 3. Associate Professor EYERLY.

11. SOCIOLOGICAL ASPECTS OF CURRENT AGRICULTURAL QUESTIONS. — Government conservation policy, roads, railways, trolleys, telephones, postal service, credit facilities, taxation, pure food laws, tenancy and ownership, intensive versus extensive farming, agricultural labor; 3 hours. Credit, 3.

Associate Professor EYERLY.

13. SEMINAR.

Associate Professor EYERLY.

GENERAL DEPARTMENTS.

MILITARY SCIENCE AND TACTICS.

Captain Martin, Mr. Parsons.

[The Department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-years course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the practical (drill) courses in Military Science are given up to the Christmas recess and from the close of the spring recess to the end of the semester each year; the corresponding courses in Physical Education occupy the intervening time.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

A dark blue uniform, old army pattern, costing about $15, is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $15 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited, unless the consent of the military instructor be obtained.]

Required Courses.

1. Freshman Drill. — Practical instruction in infantry drill regulations through the school of the battalion in close and extended order; advance and rear guards; outposts; marches; ceremonies; guard duty. Upon the conduct and proficiency of this year depends the appointment of corporals for the ensuing year. Freshmen; first semester until Christmas recess; 3 hours. Credit, 1.
Captain Martin, Mr. Parsons.

2. Freshman Drill. — As stated under Course 1. Freshmen; second semester after spring recess; 3 hours. Credit, 1.
Captain Martin, Mr. Parsons.

3. Sophomore Drill. — Practical instruction as before; pointing, aiming and sighting drills; litter drills, and first aid to the injured by detachment; target practice, in gallery and on the range. Corporals are appointed from this class. On their conduct and proficiency depends the appointment of sergeants in the next class. Sophomores; first semester until Christmas recess; 3 hours. Credit, 1. Captain Martin, Mr. Parsons.

4. Sophomore Drill. — As stated under Course 3. Sophomores; second semester after spring recess; 3 hours. Credit, 1.
Captain Martin, Mr. Parsons.

5. Sophomore Tactics. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the company, "Manual of Guard Duty," "Small Arms Firing Regulations." Sophomores; 1 hour. Credit, 1. Captain Martin.

6. Sophomore Tactics. — As stated under Course 5. Sophomores; 1 hour. Credit, 1. Captain Martin.

7. Junior Drill. — Practical instruction as before, target practice, in gallery and on the range. Sergeants are appointed from this class. On their conduct and proficiency depends their selection as officers for the ensuing year. When necessary, officers will also be appointed from this class. Juniors; first semester until Christmas recess; 3 hours. Credit, 1.
Captain Martin, Mr. Parsons.

8. Junior Drill. — As stated under Course 7. Juniors; second semester after spring recess; 3 hours. Credit, 1.
Captain Martin.

9. Junior Tactics. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the battalion; advance and rear guards; outposts; marches and ceremonies; "Manual of Field Service Regulations;" preparation of reports, returns, muster-rolls, enlistment and discharge papers, rosters, requisitions, etc.; army regulations; lectures on military science. Juniors; 1 hour. Credit, 1.
Captain Martin.

10. Junior Tactics. — As stated under Course 9. Juniors; 1 hour. Credit, 1.
Captain Martin.

Elective Courses.

11. Senior Drill. — Practical instruction as before; conduct of drills of lower classes. Officers will as a rule be selected from this class. Cadets electing Courses 11 and 12 must make the election for the year, and not later than the first Monday in June of their junior year. No cadet electing this course will after the commencement drill be permitted to change his election without the consent of the dean of the faculty and of the commandant. Seniors; first semester until Christmas recess; 3 hours. Credit, 1.
Captain Martin.

12. Senior Drill. — As stated under Course 11. Seniors; second semester after spring recess; 3 hours. Credit, 1.
Captain Martin.

PHYSICAL EDUCATION AND HYGIENE.

Assistant Professor Hicks.

Hygiene.

Required Courses.

1. Hygiene. — Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation. Freshmen; 1 hour. Credit, 1.
Assistant Professor Hicks.

Physical Education.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in Military Science. All classified undergraduate students are given a physical examination upon entering.]

Required Courses.

1. Elementary Gymnastics. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 2. Freshmen; 3 hours. Credit (given only for Course 2), 1.
Assistant Professor Hicks.

2. Elementary Gymnastics. — As stated under Course 1.
Assistant Professor Hicks.

3. Graded Gymnastics. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 4. Sophomores; 3 hours. Credit (given only for Course 2), 1.
Assistant Professor Hicks.

4. Graded Gymnastics. — As stated under Course 3.
Assistant Professor Hicks.

5. Heavy Gymnastics. — Drills, games and athletics; from January 1 to April 1, in connection with Course 6. Juniors; 3 hours. Credit (given only for Course 2), 1.
Assistant Professor Hicks.

6. Heavy Gymnastics. — As stated under Course 5.
Assistant Professor Hicks.

Elective Courses.

7. Training Course. — Leadership class and squad work; supervision of indoor and outdoor athletic contests and games; boxing and wrestling. Seniors; 3 hours. Credit, 1.
Assistant Professor Reynolds.

8. Training Course. — As stated under Course 7.
Assistant Professor Reynolds.

THE GRADUATE SCHOOL.

THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., LL.D., President of the College.

HENRY T. FERNALD, Ph.D., Acting Director of the Graduate School and Professor of Entomology.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years. Demands for these courses have now greatly increased, and in recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station agriculturists, bacteriologists, botanists, chemists, entomologists, horticulturists and zoölogists; and for numerous other positions requiring a great degree of skill and scientific knowledge.

ADMISSION.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the professor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for admission to the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, — together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

Nature and Methods of Graduate Work.

Persons taking graduate work will find this quite different in its nature from undergraduate courses. A broad knowledge of two (or three) subjects is required, and the professors in charge of these may adopt any methods which may seem desirable to secure this to the student. Lectures, laboratory and field work in various forms are utilized; but whatever the method chosen, the aim is to train the students in methods of original investigation and experiment, inductive reasoning and the ability to carry on independent research. In addition to the lectures, a large amount of outside reading is required, the object being to give a broad knowledge of all aspects of the subjects chosen, in addition to the complete knowledge of those portions involved in or directly related to the original investigation which is to result in the thesis. Originality and ability to lead in scientific research after completing graduate work, and the establishment of a broad and thorough foundation upon which these qualities must be based, are the objects aimed at; and any methods which promise to give these results may be made use of (varying according to the nature and personal equation of each student), the supervision being largely individual rather than collective.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as the major and the other as the minor. These subjects may not be selected in the same department.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major, the others as minors. No two of these subjects may be taken in the same department.

Advanced students who are not candidates for degrees may, with the approval of the faculty of the school, take more than one subject in the same department.

A statement of the subjects chosen must in each case be submitted to the director of the school for approval by the necessary committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

A description of the equipment of the various departments is given under "General Information."

THESES.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject, must show that its writer possesses the ability to carry on original research, and must be an actual contribution to knowledge.

Two copies of each thesis in its final form, ready for the printer, must be submitted to the director of the school before the candidate for the degree may take the required oral examination. One of the said copies, to contain all drawings, is to be retained as an official copy by the said director, and the other by the department in which the thesis was prepared. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis. When printed, three copies of each thesis must be deposited with the director of the graduate school and three copies with the department in which the work was carried out.

All theses become the property of the department in which they are prepared.

FINAL EXAMINATIONS.

For the degree of master of science, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degree of doctor of philosophy, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

DEGREES CONFERRED.

The degree of master of science is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.

2. The devotion of twenty hours each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The degree of doctor of philosophy is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

2. The devotion of twenty hours each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science is $10, and for the degree of doctor of philosophy, $25.

COURSES FOR DEGREE OF MASTER OF SCIENCE.

Available either as major or minor subjects for the degree of master of science: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Mathematics and physics.
Veterinary science.

Available as a minor subject for the degree of master of science: —

Zoölogy.

COURSES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

Available for a major subject for the degree of doctor of philosophy: —

Botany.
Chemistry.
Entomology.
Horticulture.

Available for a minor subject for the degree of doctor of philosophy: —

Agriculture.	Entomology.
Botany.	Horticulture.
Chemistry.	Zoölogy.

GENERAL OUTLINE OF COURSES FOR THE DOCTORATE.

(*a*) *Major Courses.*

BOTANY. — The following subjects in botany may be studied: —

(*a*) Vegetable physiology.
(*b*) Vegetable pathology.
(*c*) Mycology.
(*d*) Ecology.
(*e*) Taxonomy.
(*f*) Phylogeny.
(*g*) History of botany.
(*h*) History and theory of evolution.

These subjects are pursued, to a greater or less extent, as the previous training of the student and the nature of the original problem undertaken may determine. The object of the course is to give the student a technical training in botany, to develop the spirit of research and to lay a broad foundation in the subject. (As a supplement to this course the student will do well to take, in addition to his prescribed minor work, a brief course in the history of philosophy and psychology.) Extensive reading of botanical literature, both general and specific, is required in certain subjects, and occasional lectures are given. A botanical conference is held monthly, in which various new problems of botanical science are considered by graduate students and the seniors who elect botany. A thesis dealing with some economic problem in plant physiology or pathology, or in both, and containing a distinct contribution to knowledge, is required.

CHEMISTRY. — The department of chemistry is prepared to offer advanced courses in the following subjects: —

(*a*) Inorganic chemistry.
(*b*) General organic chemistry.
(*c*) Physiological chemistry.
(*d*) Qualitative and quantitative analysis.
(*e*) Analyses of fertilizers, cattle feeds, dairy products, soils, insecticides, sugars, and of any other materials of an agricultural nature.

Instruction may also be obtained in special problems relating to the chemistry of soils, plants and animals. Students are taught how to conduct original investigations. Further information may be secured by consulting the chemical staff of the department.

ENTOMOLOGY. — I. For the degree of doctor of philosophy as a major: Some knowledge of all the divisions of this subject is essential for the professional entomologist, though a large part of his time will be devoted only to certain portions. To insure some familiarity with all these divisions, lectures, laboratory work, field training or required reading are given in each of the following topics: —

(*a*) *Morphology.* — Embryology; life history and transformations; histology; phylogeny and the relation of insects to other arthropods; hermaphroditism; hybrids; parthenogenesis; pedogenesis, heterogeny; chemistry of colors of insects; luminosity; deformities of insects; variation; duration of life.

(*b*) *Ecology.* — Dimorphism; polymorphism; warning coloration; mimicry; insect architecture; fertilization of plants by insects; instincts of insects; insect products of value to man; geographical distribution in the different faunal regions; methods of distribution; insect migration; geological history of insects; insects as disseminators of disease; enemies of insects, vegetable and animal, including parasites.

(*c*) *Economic Entomology.* — General principles; insecticides; apparatus; special cases; photographs of insects and their work; methods of drawing for illustrations; field work on insects and study of life histories; legislation concerning insects.

(*d*) *Systematic Entomology.* — History of entomology, including classifications and the principles of classification; laws governing nomenclature; literature, how to find and use it; indexing literature; number of insects in collections and in existence (estimated); lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections of insects.

(*e*) *Seminar.* — A monthly meeting of graduates, at which reports on current literature are presented and various entomological topics of importance are discussed.

(*f*) *Required Readings.* — The best articles on the various topics named above and on the different orders of insects, to cover from fifteen thousand to twenty thousand pages of English, French and German, the candidate to be examined at the close of his course on this with his other work.

(*g*) *Thesis.* — A thesis, illustrated with drawings, consisting of the results of original investigation upon one or several topics, and constituting a distinct contribution to knowledge, must be completed before the final examinations are taken.

II. For the degree of doctor of philosophy as a minor, and for the degree of master of science either as a major or minor: Such portions of the course outlined above as seem most appropriate to their other subjects are given to students taking entomology as a minor.

HORTICULTURE. — The work in horticulture necessarily varies considerably with different candidates, since its most important features are specialization, original investigation and the development of individual initiative in dealing with new questions. Each candidate must select some special field of horticultural study, and devote himself to it continuously. He will be required to attend lectures, conferences and seminars dealing with horticulture in its broader aspects, and to do advanced work in the following subjects: —

(*a*) Systematic pomology.
(*b*) Pomological practice.
(*c*) Commercial pomology.
(*d*) Systematic, practical and commercial olericulture.
(*e*) Greenhouse plants and problems.
(*f*) Floriculture.
(*g*) Landscape gardening.
(*h*) Plant breeding and general evolution.
(*i*) Questions of physiology connected with propagation and pruning.

Other requirements and opportunities are (1) periodical seminars, with special lectures by prominent men from outside the college; (2) extensive and systematically planned readings; (3) frequent visits, always with definite purpose, to orchards, gardens, greenhouses, estates and libraries outside the college grounds; and (4) the preparation and publication of a thesis which shall set forth the results of the candidate's major study, and be an original and positive contribution to horticultural knowledge.

It is probable that the work in horticultural subjects will soon be considerably developed and modified.

(*b*) *Minor Courses.*

ZOÖLOGY. — Courses in zoölogy are available as a minor for the degrees of master of science and doctor of philosophy. The nature of the work varies according to circumstances, and may be intensive in a special field, or of a somewhat more general character; depending on the student's previous acquaintance with general zoölogical science.

The time devoted to zoölogy as a minor for either of the above-named degrees may vary from twelve to sixteen hours per week, pursued for a year and a half.

THE SHORT COURSES

AND

THE EXTENSION SERVICE.

THE SHORT COURSES AND THE EXTENSION SERVICE.

Under the usual definition of extension activities, Short Courses are not strictly extension work. They are rather a part of the academic work of the institution. For the sake of administrative efficiency it has seemed best to place them in charge of the Director of the Extension Service, in so far as organization and direction are necessary. An effort is made through these courses to bring to the college, for a few weeks or a few days, as many people as can possibly be reached in this way. In the main, the instruction in the Short Courses is given by the regular teaching force of the college, the same laboratories and equipment being used for this work as in the regular college work.

The Extension Service proper comprises various methods for the dissemination of agricultural information to the people of the Commonwealth who are interested in agriculture and country life, but who cannot come to the college for even a short time. The object of the Extension Service is to make the college as useful to the people of the Commonwealth as is possible.

A. THE SHORT COURSES.

ORGANIZATION AND DESCRIPTION.

The work is organized thus: —

Short Courses given at the College.
1. Winter School.
    - (*a*) Ten Weeks' Winter Course.
    - (*b*) Poultry Course.
    - (*c*) Farmers' Week.
    - (*d*) Beekeepers' Course.
    - (*e*) Packing School.
2. Summer School.
    - (*a*) The Summer School (General Course).[1]
    - (*b*) Conference for Rural Leaders.

---

[1] Omitted in 1912.

ENROLLMENT, 1910–11.

Ten Weeks' Winter Course,	113
Special Poultry Course,	74
Farmers' Week,	830
Beekeepers' Course,	16
Summer School,	153
Conference of Rural Social Workers,	247
Total,	1,433

Short Courses at the College (Winter School; Summer School).

EXPENSES IN THE SHORT COURSES. — The expenses of attending either of the short courses will be about as follows: —

Registration fee,	$5
Furnished rooms with private families, per week,	$1–$3
Board at college dining hall, per week,	$4
Board with private families, per week,	$4–$5

Students in either of the dairy courses must provide themselves with two white wash suits and a white cap for use in the practical dairy work; the cost in Amherst is about $1.25 for suit and cap.

REQUIREMENTS FOR ADMISSION TO SHORT COURSES. — No entrance examinations are required, but students are advised to review their school work in English and arithmetic before entering. Practical experience in farm, garden, orchard or greenhouse work will be an advantage. The courses are open to both men and women. Students must be at least eighteen years of age, and must furnish satisfactory evidence of good moral character.

Application for admission should be made as early as possible. Students should report to the professor in charge on Monday, Jan. 6, 1913, in order to begin work promptly on the morning of Jan. 7, 1913.

COURSES IN THE TEN WEEKS' WINTER SCHOOL (JAN. 2 TO MARCH 8, 1912). — The following courses were given: —

1. Soil Fertility. Director HURD and Assistant Director WAID. Three exercises a week for ten weeks.
2. Field Crops. Assistant Professor HASKELL. Three exercises each week for ten weeks.
3. Breeds and Breeding. Associate Professor McLEAN and Mr. QUAIFE. Three exercises weekly, with appointed hours for stock judging.
4. Feeding and Management. Associate Professor McLEAN and Mr. QUAIFE. Two exercises weekly.

5. Dairying. Associate Professor Lockwood, Mr. Story and assistants. Three one-hour and two two-hour periods.
6. Dairy Bacteriology. Associate Professor Lockwood. Two exercises each week.
7. Animal Diseases and Stable Sanitation. Dr. Paige. Two exercises each week.
8. Poultry Course. Associate Professor Graham. Lectures with one or two demonstration periods per week.
9. Fruit Growing. Professor Sears. Five exercises each week for ten weeks.
10. Market Gardening. Assistant Professor Yeaw. Three lectures and one afternoon practicum each week for ten weeks.
11. Landscape Gardening. Professor Waugh and Mr. Harrison. Twenty exercises.
12. Floriculture. Professor White. Five exercises each week.
13. Forestry. Associate Professor Moon. One lecture a week for ten weeks.
14. Botany. Assistant Professor Osmun and Mr. McLaughlin. Three exercises each week.
15. Entomology. Professor Fernald and assistants. Three exercises each week.
16. The Development of the Community. Two periods a week for ten weeks.
17. Farm Buildings and Machinery. Professor Foord. One exercise a week for ten weeks.
18. Farm Accounts. Professor Foord. One exercise each week.
19. Mechanics. Professor Lockwood and Mr. Wallace. One exercise of two hours each week.
20. Meat, Meat Production and Marketing on the Farm. Mr. Hinkley, of Armour & Co.
21. Rural Sanitary Science. Assistant Professor Gage. Two one-hour exercises per week.

The One Week Poultry Course (Winter School, March 4 to 8, 1912). — In order to give a large number of poultry men, who cannot come to the college for a longer time, practical instruction in modern methods of breeding, feeding, poultry-house construction, operation of incubators and brooders, selecting and judging poultry for utility and for show, marketing poultry products, etc., a convention was held on the dates given above. The week was filled with practical talks and demonstrations. Some of the leading professional and practical men in this country were engaged to supplement the work of the regular faculty. No charges aside from cost of room and board were made for this course.

Farmers' Week (Winter School, March 11 to 15, 1912). — In order to reach those who cannot come to the college for a longer time, this very practical course, four days in length, is given. The regular college equipment is used, and the work of the regular faculty will be supplemented by lectures and demonstrations given by eminent men.

The work is divided into three sections: (1) General agriculture, to include farm management, farm crops, dairying, animal breeding and feeding, veterinary science and bacteriology; (2) Horticulture, to include fruit growing, market gardening, floriculture and forestry; (3) Farmers' wives' section, including lectures and demonstrations in home economics, cookery and problems of home making.

Features of the week will be the evening lectures by specialists along agricultural lines, the conference pertaining to problems of rural betterment aside from practical agricultural topics, a corn and grain show, and others.

The Massachusetts Dairymen's Association, M. A. C. Agricultural Improvement Association and other organizations hold their annual meetings at the college this week.

BEEKEEPERS' COURSE (WINTER SCHOOL, MAY 29 TO JUNE 12, 1912). — The college has recently come into possession of a number of swarms of bees which, with the other equipment to be added, will afford a fine opportunity for those interested to get some practical information on this subject. The course will be under the direction of Dr. Burton N. Gates. The following courses will be given: —

1. Practical Phases of Beekeeping. Assistant Prof. BURTON N. GATES.
2. Crops for Honey Bees. Dr. WILLIAM P. BROOKS.
3. Relation of Bees to the Pollination of Plants. Prof. GEORGE E. STONE.
4. Origin and Evolution of the Honey Bee. Prof. HENRY T. FERNALD.
5. Bees and Beekeepers' Supplies. Dr. JAMES B. PAIGE.

PACKING SCHOOL (WINTER SCHOOL, FEB. 12 TO 24, 1912). — The greatest need in New England fruit growing is acknowledged to be proper grading and packing of the fine fruit that is already being grown. To give all who desire it the best of instruction in this subject, a two weeks' course in packing was arranged between the dates given above. The work consisted of grading and packing apples in boxes and barrels. Special lectures and demonstrations were arranged for those who attended, on the subjects of planting, fertilizing, pruning, spraying and the management of orchards.

THE SUMMER SCHOOL (GENERAL COURSE). — The very successful summer school of agriculture and country life which has been held by the college for the last five years will be omitted in 1912. In 1913 it will be resumed, with the addition of new courses, more instructors and covering a broader scope of work.

A bulletin giving the courses, instructors and other information will be issued in March, 1913.

CONFERENCE FOR RURAL LEADERS (SUMMER SCHOOL, JUNE 28 TO JULY 3, 1912). — The Conference for Rural Leaders which has been held as a closing feature of the summer school will take place as usual, except at an earlier date (June 28 to July 3 inclusive).

The Federation of Churches of Massachusetts, the State Library Commission, Massachusetts Civic League, the New England Home Economics Association, the County Work of the Y. M. C. A. and the State Board of Education have each decided to co-operate with the college by furnishing teachers and lecturers for their respective sections. The State Grange and the State Board of Health have been asked to co-operate in a similar manner.

Definite class instruction will be given each morning. The afternoons will be given up entirely to special and general conferences, demonstrations of organized play, recreation, etc. The evenings will be given over to music and lectures by the most eminent men, who are making a study of rural sociology, economics and education.

The Rural Social Service exhibits will be more elaborate and extensive than in 1911.

The object of this conference is to acquaint those who are leaders in their respective communities with the work that is going on, not only in Massachusetts but in New England and other parts of the world, and to give them renewed inspiration and enthusiasm for larger and more intelligent efforts.

Teachers, clergymen, grange officers, librarians, county Y. M. C. A. workers, town officers, boards of health, officers of village improvement societies, home makers, school officers, and all others interested in community development, are cordially invited to attend this conference. The expenses for board and room are low. There are no tuition or registration fees.

A complete program will be published next May and can be had by making application for it.

B. THE EXTENSION SERVICE.

ORGANIZATION AND DESCRIPTION.

1. Special Days for Foreigners; Agricultural Organizations, etc.; Polish Farmers' Day.
2. Instruction given away from the College.
    1. Correspondence Courses.
    2. Lecture Courses and Demonstrations.

3. Conferences for Community Development.
4. Extension Schools of Agriculture.
5. Educational Trains (Steam and Trolley).
6. Educational Exhibits, with Lectures and Demonstrations at Fairs.
7. Demonstration Orchards.
8. Dairy Improvement Associations.
9. The M. A. C. Agricultural Improvement Association.
10. Agricultural Surveys.
11. Advisory Work with Individuals, State Institutions, etc.
12. Publications, "Facts for Farmers," etc.
13. Student Extension Work.
14. Faunce Demonstration Work.
15. Boys and Girls' Clubs.
16. Demonstration Plots.
17. Traveling Libraries.
18. Co-operation with Various Organizations already in Existence.
19. District Field Agents.
20. Information by Correspondence, etc.

1. *Special Days for Foreigners, Associations, etc.*

Days are set aside for especial attention to the interests of foreigners, of agricultural organizations, etc.

AGRICULTURAL ORGANIZATIONS. — It has been especially pleasing to the college to have organizations such as the Massachusetts Poultry Association, the Massachusetts Fruit Growers' Association, Market Gardeners' and Breeders' Associations, and others of a similar nature meet frequently at the college. Usually, a program of one or two days is provided, largely by the college faculty. These meetings serve the twofold purpose of giving the members of these organizations a chance to inspect the equipment and see the work that is being carried on by the college, and it also gives the college men a chance to find out the needs of the men engaged in the various lines of agriculture. It is to be hoped that organizations like those named above and others will continue to meet at the college even more frequently than in the past.

POLISH FARMERS' DAY. — In order to show the Polish farmer — who forms a large part of the population of this section of the Connecticut valley — what the college has to offer him, a Polish Farmers' Day was held in 1911. This was such a success that a like day was held March 28, 1912. Members of the faculty gave lectures which were interpreted by Mr. Wolski of Holyoke; some of the Polish farmers who have made a success of farming also gave talks. The Y. M. C. A. co-operates with the college in this work, and Dr. Tupper of the Immigration Department and Mr. Rudman, county secretary for Franklin County, addressed the gathering.

Mr. John Romaszkiewisc, president of the Polish American Alliance, also gave an address.

2. *Instruction given away from the College.*

An abstract follows of the instruction that is given away from the college. The abstract divides this instruction into correspondence courses and instruction not included in the correspondence course.

Correspondence Courses. — The correspondence courses are offered by the Massachusetts Agricultural College in response to calls from all sections of the State, from people who desire agricultural information but who, for various reasons, cannot come to the college for it. These courses are designed to meet the needs of farmers, dairymen, stock breeders, fruit growers, market gardeners, floriculturists and teachers, either in elementary schools, high schools, academies or normal schools.

Since agricultural science and practice have changed and are changing so rapidly, it is the purpose to give a summary of the latest information on the subjects treated, yet in such language that any who pursue the study can readily understand the work. Additional courses, covering other subjects, will be added later.

Method of Conducting Correspondence Work. — While a large number of books have been written on various agricultural subjects, very few of them are especially adapted to the correspondence course work. For this reason our courses are conducted principally by especially prepared lessons. The subject-matter of these lessons partakes somewhat of the lectures that are given to the college classes. Whenever possible we recommend one or two books which ought to be purchased and read along with the course. Other books are recommended for collateral reading, which oftentimes can be obtained from the local libraries.

The courses are especially recommended to Y. M. C. A.'s, granges and other farmers' clubs for study. It is to be hoped that grange lecturers, club secretaries or some other interested person will organize study classes. If the size of the class, or the interest which the members take in the subject, is sufficient, we shall be pleased to send a representative of the college to the class from time to time to discuss the work and offer suggestions. A description of the correspondence courses follows: —

1. Soil and Soil Improvement. Director W. D. Hurd. The cost of the course is $1.

2. Manures and Fertilizers. Director W. D. Hurd. The cost of the course is $1.
3. Field Crops. Assistant Prof. Sidney B. Haskell. The cost of the course is $1.
4. Farm Dairying. Prof. W. P. B. Lockwood. The cost of the course is $1.
5. Fruit Growing. Prof. F. C. Sears and Mr. A. J. Norman. The cost of the course is $1.
6. Market Gardening. Assistant Prof. F. L. Yeaw. The cost of the course, including the textbook, is $2.50.
7. Animal Feeding. Mr. G. F. Story. The cost of the course is $1.
8. Floriculture. Prof. E. A. White. Part I. The general culture of plants, including those grown out of doors as well as those grown under glass. Part II. Greenhouse construction and heating. Part III. Carnation culture. Part IV. Rose culture. The cost of each part, not including the textbook, is $1.
9. Farm Accounts. Prof. J. A. Foord. The cost of the course is $1.
10. Agriculture in the Common Schools. Assistant Prof. F. B. Jenks. The cost of the course is $1.
11. Agricultural Education. Prof. W. R. Hart. The cost of the course is $1.
12. Beekeeping. Assistant Prof. B. N. Gates. The cost of the course is $1.
13. Forestry. Associate Prof. F. F. Moon. The cost of the course is $1.
14. Shade Tree Management. Prof. G. E. Stone. The cost of the course is $1.
15. Entomology. Prof. H. T. Fernald. The cost of the course is $1.
16. Poultry. Associate Prof. J. C. Graham. The cost of the course is $1.

Enrollment for Correspondence Courses. — Students may enroll in the correspondence courses any time between September 1 of each year and the following 1st of June. It has been found advisable not to run the courses during the summer, because the farmers as well as the other students are so busy that they cannot spend the necessary amount of time upon the lessons during the summer months. We are better equipped than we were last year to handle the great number of students who desire these courses, and we hope to be able to handle all the students who enroll; nevertheless, it will be well to enroll early so as to be sure of getting in before the enrollment closes.

Enrollment must be made on the card which is furnished by the college. This will entitle the student to a suitable set of covers for the courses, and other privileges.

Expenses of the Correspondence Courses. — In order that none may enroll but those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at the uniform rate of $1 for each course, except in Course 8, where it is necessary to charge $1 for each of the four parts, as each part is really a course in itself. This fee is payable strictly in advance, when the enrollment card is sent. The first lesson of the course will not be sent until the enrollment fee is paid.

This fee is not charged to cover cost of preparing the course, for this, in time of the instructors, is many times what is received, but it is used to defray the expenses of postage and materials which are used in preparation of the lessons, and to insure a higher quality of work from those who enroll.

The cost of the text-book, when one is used, is in addition to this enrollment fee. We strongly urge all students to purchase one or two books to be used in connection with each course, because they can be kept and used for reference purposes after the course is completed. We have made arrangements with the Johnson Book Company, Amherst, Mass., to handle all of these books at reduced rates.

For a catalogue of books and prices address the Johnson Book Company, Amherst, Mass.

Remittances should be made by money order or check.

LECTURE AND DEMONSTRATION COURSES AWAY FROM THE COLLEGE. — The renewed and unprecedented interest in agriculture and rural life makes many more calls on the college for lectures and demonstrations than can be met. These calls come from all sorts of organizations, and the audiences are usually of good size and comprised of interested people, who are eager to get the latest scientific information to use in their work.

CONFERENCES ON COMMUNITY BETTERMENT. — Largely as an outgrowth of inspiration received in our Summer School and Conference, meetings have been held in West Newbury, Sandwich, Walpole, Rowe and Kingston, where subjects of community betterment were discussed. The whole State is alive to this question, and many similar meetings are known to be contemplated for the near future.

EXTENSION SCHOOLS OF AGRICULTURE. — There has been a call from differents parts of the State for instruction of a more systematic and far-reaching nature than can be given in a single lecture or demonstration. Extension schools, five days in length, have been planned for West Brookfield, Walpole, Shelburne and Kingston. Several other applications for similar schools are already in file.

EDUCATIONAL TRAINS (STEAM AND TROLLEY). — In 1910, co-operating with the State Board of Agriculture, the State Forester and the Boston & Albany and Springfield trolley systems, a steam train (four cars) and a trolley train (five cars) were run through western Massachusetts. Stops of from one and one-half to two hours were made at Westfield, Pittsfield, Cheshire, North Adams, Chester, Springfield, Enfield, New Salem, Athol, Templeton, Barre, Ware, Palmer, East Brookfield, Worcester, Westborough, South Framingham, Milford, Amherst, South Hadley, Russell, Huntington, North Wilbraham, Brimfield, Sturbridge, Charlton, Oxford, Holden and Sterling. Inquiries have already come in asking when more of this kind of work will be carried on.

EDUCATIONAL EXHIBITS, LECTURES AND DEMONSTRATIONS AT FAIRS. — During the last two years the college has made extensive exhibits at fairs held in Barnstable, Worcester, Clinton, Greenfield, Amherst, Northampton, Topsfield, South Framingham and Amesbury; also at the New England Corn Show, the National Corn Show, Columbus, O., the Massachusetts Corn Show and the New England Industrial Exposition. At each fair five or six short practical talks and demonstrations have been given each day. Fair managers and the general public have been very appreciative of this work.

DEMONSTRATION ORCHARDS. — New orchards of from four to six acres each have been planted by the college in the towns of West Newbury, Westhampton, Sturbridge, Medway, Granville, Enfield and North Adams. Renovation plots have been selected in Hardwick, North Adams and North Grafton.

DAIRY IMPROVEMENT ASSOCIATIONS. — Two of these have been started during the year, one in the Connecticut valley and one in Norfolk County. Other sections of the State desire the college to organize similar associations, but so far we have been unable to find men to act as official testers.

THE M. A. C. AGRICULTURAL IMPROVEMENT ASSOCIATION. — This is an organization of ex-students of this college, banded together for the purpose of improving plants, animals and the conditions of rural life. There are now 110 members. The usefulness of this organization depends almost entirely on the ability of the college to furnish proper supervision for the organization and direction of the work.

AGRICULTURAL SURVEYS. — Through these surveys an attempt is made, by systematic study, to find out the exact conditions of farm management, including dairying, orcharding, poultry raising and other specialties, the income which is derived from these, and the facilities for marketing products. An inquiry into the social, educational, religious and moral life of rural communities is also made. Under the direction of Dr. Alexander E. Cance and two assistants, a fairly comprehensive survey of the town of Belchertown was made during the past summer.

ADVISORY WORK WITH STATE INSTITUTIONS, INDIVIDUALS, ETC. — From letters received from about 28 State institutions, it is evident that co-operation on the part of the college in the handling of the agricultural plants connected with these institutions would be warmly welcomed and is much desired. Some of these institutions have already been visited and help has been given. A large number of individuals have applied to the college for expert advice and help. It is possible to send men to only a small percentage of those who have asked for this personal help.

EXTENSION SERVICE PUBLICATIONS. — Each year, bulletins and circulars descriptive of the various short courses have been published. Each month, "Facts for Farmers" has been issued, and is much sought after. The titles of the pamphlets already published are as follows: "Directions for Selecting Corn for Exhibition," "Fall Spraying for Massachusetts Orchards," "The Possibility of Keeping Bees," "Some Good Books for Farmers and Others interested in the Affairs of the Country," "Pruning of Shade Trees," "Top Grafting Fruit Trees," "Feeding for Milk Production," "Home-mixed Fertilizers," "Summer Spraying," "The Feeding and Care of Chicks hatched artificially," "Home Vegetable Gardening," "Fruit for Exhibitions," "Pig Feeding," "Clean Milk." A list of desirable books on agriculture and rural social science is usually kept on hand for distribution.

STUDENT EXTENSION WORK. — About 30 of our college students have been doing volunteer work in the smaller towns near Amherst during the past two years. The communities reached have been Cushman, Sunderland, Leverett, Shutesbury, Pelham, Belchertown, South Amherst, Hadley, South Hadley, North Hadley, Dwight, Granby, Conway, Ashfield, Hatfield, Shelburne Falls, Three Rivers, Cummington and Northampton. The work has consisted chiefly in teaching English to foreigners, coaching school athletic teams, supervising contests, organizing debating societies, giving talks on clean living, conducting religious services, giving musical entertainments, teaching Bible classes, acting as judges at grange fairs, etc.

THE FAUNCE DEMONSTRATION FARM. — This farm, located at Sandwich, has been under the direction of a committee from our faculty, of which the Director of the Extension Service is chairman. The farm has demonstrated beyond a doubt that small fruits, vegetables and poultry can be raised at a profit on Cape Cod. Through the work of this farm the whole community has taken on new life. The superintendent of the farm, Mr. A. W. Doolittle, has taught agriculture in the schools of the village, and has given much help to the farmers of Barnstable County by his personal visits to farms.

Boys' and Girls' Clubs. — This work has been under the direction of Prof. W. R. Hart and Assistant Prof. F. B. Jenks of the Department of Agricultural Education. The large numbers enrolled, and the interest that has been shown on the part of school superintendents, parents and pupils, will attest to the value of these clubs as a means of turning the attention of the young people in our smaller towns to the possibilities open to them in their home communities.

Demonstration Field Plots. — Aside from the work done by the members of the M. A. C. Agricultural Improvement Association, little has been done toward placing demonstration plots in different sections of the State. Co-operating with the Bureau of Plant Industry of the United States Department of Agriculture, four demonstration pasture plots have been placed on farms in the vicinity of Amherst, for a study of some method of improving the typical hill pastures of Massachusetts.

Traveling Libraries. — Through the generosity of several of the leading publishers of agricultural books, in donating about 160 of the latest books on various agricultural subjects, the college has been able to place in circulation four traveling libraries. These they loaned to the libraries of small towns for a few weeks at a time, and the books are loaned to those interested in reading them. These libraries are in great demand.

Co-operation with Existing Organizations. — The aim of those in charge of the Extension Service has, from the start, been to co-operate with existing organizations so far as possible. During the past two years we have co-operated with the State Board of Agriculture, the State Board of Health, the State Dairy Bureau, the State Grange, the Boston Chamber of Commerce, the Springfield Board of Trade, the county work of the Y. M. C. A., several village improvement associations, the Tent Evangelistic Work in western Massachusetts, the Y. M. C. A.'s of Worcester and Springfield, men's clubs in churches, women's clubs, the schools of a number of towns, and other agencies interested in the rural problem.

District Field Agents. — Mr. Charles H. White (M. A. C. 1909) is now devoting part time to the work of field agent in southern Worcester County. Mr. White visits farms, and is ready, on consultation by farmers, to bring to the men the best advice the experts at the college can give. He attends grange meetings, farmers' institutes, and co-operates with all sorts of organizations on the arrangement of programs. He is available for conferences at all times with farmers on questions of farm management.

Through the Short Courses and the Extension Service, an effort is made to render the departments of the Massachusetts Agricultural College as helpful to the people of the Commonwealth as they can be. Correspondence is invited from any who desire such helps as have been spoken of. Letters should be addressed to the Director of the Extension Service, Massachusetts Agricultural College, Amherst, Mass.

GENERAL INFORMATION.

General Information.

A. FINANCIAL AND ADMINISTRATIVE.

Student Expenses.

Tuition. — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of $40 a year. The tuition charged persons not citizens of the United States is $120 a year. Students entering from Massachusetts are required to file with the president a statement signed by either town or city clerk, stating that the applicant's father is a legal resident of Massachusetts.

Dormitories and Board. — The college has dormitory accommodations for about 62 students. The rooms in the dormitories are occupied by the upper classmen, hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suites of three, — one study room and two bed rooms. These rooms are heated by steam and lighted by electricity; they are cared for by students occupying them. The dormitory rent for each person varies from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1.25 to $3 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present the price of board there is about $4 a week. Board is furnished at cost, the price being determined by adding 5 per cent. to the audited rate for the previous three months, and at the end of the period final settlement is made on the basis of actual cost.

Expenses.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts free; other citizens of the United States, $40 a year; foreigners, $120 a year.

	Low.	High.
Room in college dormitories or in private houses,	$39 00	$110 00
Board in college dining hall, $4 a week,	144 00	144 00
Laundry, 50 cents to 85 cents a week,	18 00	30 00
Military uniform, first year,	13 50	13 50
Laboratory fees,	2 00	20 00
Books, stationery and other miscellaneous,	23 50	32 50
	$240 00	$350 00

OTHER EXPENSES. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various student organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe keeping of student furniture in dormitories, either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between $250 and $350 per year.

Laboratory Fees.

The following laboratory fees are at present charged. The schedule is subject to modification without previous announcement in the catalogue.

	Per Semester.
Botany: —	
Graduates,	$4 00
Courses 2, 3,	3 00
Course 4,	2 00
Course 5,	1 00
Courses 7, 9, 11, 13,	3 00
Chemistry: —	
Courses 1, 2, 11, 13, 14, each,	3 00
Courses 4, 5, 6, each,	4 00
Courses 9, 10, 15, 17A, B, C or D, 18A, B, C or D,	5 00
Entomology: —	
Graduate,	3 00
Entomology 3,	3 00
Entomology 4,	3 00
Landscape gardening: —	
Landscape gardening 1, 2,	2 50
Landscape gardening 3, 4, 7, 8,	4 00
Landscape gardening 6,	1 00
Drawing 1, 2,	2 50
Zoölogy: —	
Elementary 1,	2 00
Invertebrate 3,	4 00
Vertebrate 4,	4 00

STUDENT AID.

SELF HELP. — A number of students find opportunities for earning money without depending upon the college to furnish them with work, and many are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least $150 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should remember that, owing to the large number of applications for employment, no one man can receive a large amount of work through the college.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and thirty or more students are employed at the dining hall. Applications for student labor should be made directly to the president. Applicants are required to present a certificate, signed by parent or guardian and by one of the selectmen or aldermen of the town or city in which they reside, showing that the applicant needs the assistance. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

SPECIAL NOTICE TO NEEDY STUDENTS. — In the last year or two the demand for paid labor on the part of new students has far exceeded the amount of employment that the college can offer.

The college cannot promise work to any student, particularly to freshmen; it accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.

Student Accounts.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each semester. This rule is strictly adhered to, and no student will be allowed to register in his classes until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each semester at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the semester he is more than one week in arrears in his payment for board.

All money due for student labor shall be applied on account toward any bills that a student may owe to the institution.

B. COLLEGE ACTIVITIES.

General Exercises.

Chapel exercises are held four mornings each week. On Wednesday, instead of chapel an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is usually held during the winter months. Students are required to attend these general exercises, although the president is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

Student Activities.

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established about four years ago. All students become members of the Union by paying a small fee. The Union is designed to become the center of student interests. In North College it has a trophy room and a large lounging room for music, reading and study. In the basement of this building there is also a game room for pool and billiards. In the fall and winter months the Union gives a series of entertainments, free to the students and faculty.

The College Senate is composed of representatives of the junior and senior classes. This body serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The Young Men's Christian Association is active both socially and religiously. Under its direction voluntary Bible classes are conducted during the winter months. A Catholic Club has also been organized.

The musical organizations include an orchestra, a mandolin club and a glee club. These furnish music for college meetings, and occasionally give concerts at the college and at other places. A military band is maintained as part of the cadet corps.

A Dramatic Club has been organized, and each year presents a play.

The Athletic Association represents in the college the interests of football, baseball, track, hockey and tennis.

A Rifle Club has been organized for a few years. Teams representing this club have repeatedly won the intercollegiate championship of the country, both in indoor and outdoor contests.

The college publications are the "Signal," published weekly by the student body, and the "Index," published annually by the members of the junior class.

The Stockbridge Club is an organization of students especially interested in practical agriculture, horticulture and floriculture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

Scientific clubs also exist in the departments of French, entomology and landscape gardening.

C. ACADEMIC AND DEPARTMENTAL.

Degrees.

Those who complete a four-years course receive the degree of bachelor of science. The fee for graduation from the college is $5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of $10.

Credit may sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-years course of study, and present a satisfactory thesis, will be granted the degree of doctor of philosophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest fifth of the senior class who have attained an average grade of at least 85 per cent. during their college course.

PRIZES.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes offered in 1912 are: —

AGRICULTURE. — The Grinnell prizes (first, second and third), given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. They are $25, $15 and $10.

BOTANY. — The Hills prizes (amounting to $35), given by Henry F. Hills of Amherst, will be awarded to members of the senior class as follows: for the best herbarium, $15; for the best collection of Massachusetts trees and shrubs, $10; for the best collection of Massachusetts woods, $10. No collection deemed unworthy of a prize will be considered. In 1912, a prize of $5 is offered to that member of the sophomore class who presents the best herbarium of native flowering plants.

GENERAL IMPROVEMENT. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who, during the first two years in college, has shown the greatest improvement in scholarship, character and example.

PUBLIC SPEAKING. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declarations in the Burnham contest, $15 and $10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, a gold medal and $20 and $15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and $15. The preliminary contests in debate are open, under certain restrictions, to all regular students.

MILITARY DIPLOMAS.

Military diplomas are given to those men receiving the degree of bachelor of science who by their work in the department of military science have shown themselves worthy of distinction. These diplomas recommend those receiving them for commissions in the United States army or the militia of the several States.

EQUIPMENT.

AGRONOMY. — The work in agronomy is carried on by means of lectures, laboratory work and field work. The laboratories are in the north wing of South College. The seed laboratory is equipped with samples of the different grains and seeds of economic importance in field culture, and with apparatus for the study and testing of these seeds, including microscopes and the apparatus necessary for viability and purity tests. The soil laboratory is well equipped with apparatus for the study of the physical properties of soils, including an electric centrifuge; an electric resistance thermometer for determining soil and other temperatures; evaporimeters and drying ovens; and good balances. For the work in drainage there is available a surveyor's transit, a wye level, drainage levels, rods, steel tapes, surveyor's pins, and a set of drainage tools. The college farm may also be considered a part of the agronomy laboratory.

ANIMAL HUSBANDRY. — The most important part of the equipment for laboratory work in animal husbandry is the new judging pavilion, which will be completed by Jan. 1, 1911. This will give new opportunities for practice work in management of live stock, together with demonstrations in judging. Another very essential part of the equipment for this department is the live stock of the college farm, which includes pure bred and grade Ayrshire, Guernsey, Holstein and Jersey cattle, French coach and Percheron horses, and Berkshire swine. A set of plaster-of-paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different food stuffs available for the use of the New England farmer, are included in the equipment for this work.

BOTANY. — The department of botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for sophomore and junior work, and one for senior work; and three rooms specially fitted for graduate students. The experiment station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with all necessary conveniences. The basement contains a bacteriological laboratory, a seed and soil room; and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe, and other tools and appliances. In the senior laboratory is a room designed especially for physiological work; this laboratory is well supplied also with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc. The herbarium contains 15,000 species of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and about 12,000 sheets of fungi. The laboratory is equipped with 90 modern compound microscopes and a number of dissecting microscopes, microtomes and a large series of charts. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experiment work and for housing material often needed in the laboratory.

CHEMISTRY. — The department of chemistry occupies an entire building, supplied with a large assortment of apparatus and chemical materials. The lecture room on the second floor seats 84 students and that on the third floor 100 students. The laboratories for beginners have 80 working tables, which accommodate 180 students in sections. Each table is supplied with reagents and apparatus for independent work. Well-equipped organic, physiological and quantitative laboratories for advanced students are also provided. The weighing room connected with the quantitative laboratory has 11 balances. The equipment includes a valuable and growing collection of specimens and samples of rocky minerals, soils, raw and manufactured fertilizers, food, milk products, fibers, various other vegetable and animal products, and artificial preparations of mineral and organic compounds; and also a series of preparations for illustrating the various stages of different manufactures from raw material to finished product.

DAIRYING. — Two large, well-drained, cement-floored rooms in the South College are used for dairy work. These are equipped with a milk heater, separators, coolers and aërators, a pasteurizer, ripening vats, churns, butter workers, a mechanical can washer, a sterilizer, and other small apparatus necessary to a well-equipped dairy or butter factory. A third room is equipped with hand and power Babcock milk-testing machines and other apparatus used for milk and butter testing. These rooms have individual lockers for students. The new sanitary dairy and stable give an opportunity for practical laboratory work in the production and handling of certified milk.

DINING HALL. — Draper Hall, a brick colonial building, equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college.

DRAWING. — Two rooms on the second floor of Wilder Hall are occupied by the classes in drawing. They are equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details, and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

ENTOMOLOGY. — *Entomological Laboratories.* — The equipment for work in entomology is perhaps unexcelled in this country. In the new fireproof entomological and zoölogical building, first used in the fall of 1910, are fine lecture rooms, laboratories and museums for use in the different courses. The senior laboratory will accommodate 70 students at one time; a desk, equipped with compound microscope and accessories, together with glassware, reagents, etc., and supplied with electric light and gas, is provided for each student. Dissecting microscopes, microtomes and other apparatus are available for use. The graduate laboratory is similarly equipped. It will accommodate 20 students. The large and rapidly growing collections of insects are in a room adjoining both laboratories. In the library of the building is an excellent collection of the more important books and journals treating of entomology, and many more are accessible in the college library and in the private libraries of the professors, in all making available more than 25,000 volumes, many of which cannot be found elsewhere in the United States. A card catalogue giving references to the published articles on different insects contains more than 60,000 cards, and is the largest index of its kind in the United States, and probably in the world. In the basement is a pump room where may be studied the construction of the different types of spray pump, methods of repairing them; hose, couplings, nozzles and the other parts of spraying outfits are provided, not only for examination but for use. In another room, provided with chemical desks and apparatus, methods for the determination of the impurities and adulterations of insecticides are taught. As the insectary of the Massachusetts Agricultural Experiment Station is in the same building, the facilities it offers are also available. A greenhouse, where plants infested with injurious insects are under observation and experimental treatment, is also open to students. Photographic rooms with cameras and other photographic apparatus are provided, and the large greenhouses, gardens, orchards and grounds of the college offer further opportunities for the study of injurious insects under natural conditions.

Farm Administration. — The college farm of 190 acres is under the supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The work in this department includes the production of the common field crops, and the care and raising of the different classes of live stock mentioned under animal husbandry. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied.

Floriculture. — The department of floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a department of floriculture better equipped than this. The legislative appropriation of 1908 has made possible the erection of a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of plant materials.

Forestry. — The aim of the course in forestry is to prepare men for the advanced study in forestry schools, and at the same time, by laying particular stress on local conditions, to enable them to handle the farm wood lot in the same scientific manner as the rest of the farm. The college is well situated for forestry study. There is a good forest nursery on the college grounds; also two typical farm wood lots. In the vicinity are considerable areas of typical New England forest land.

Geology. — A large, well-lighted laboratory for geology, 27 by 50 feet, is in the basement of the new building for entomology, zoölogy and geology. This is equipped with cabinets, models, charts and a teaching collection of rocks. It has a seating capacity of 50 persons. Adjoining this is a smaller laboratory, 21 by 27 feet, for mineralogy, supplied with gas and cabinets for models, crystals and minerals. There is also a small laboratory for grinding thin sections and a private laboratory, 6 by 19 feet, for analysis work. The geological museum is 27 by 48 feet. It has 6 large cases for exhibition purposes.

The equipment for geology is being enlarged. At present, in addition to the general items mentioned above, it consists of a petrographic microscope, an illustrative series of thin sections, a small collection of invertebrate fossils, some casts of vertebrate fossils, a collection of the building stones of Massachusetts and a duplicate set of the Edward Hitchcock survey collection of the rocks and minerals of Massachusetts.

Heating, Lighting and Power. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop.

LANDSCAPE GARDENING. — The work in landscape gardening is developed in a strong technical four-year course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, aboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for thorough work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

LIBRARY. — The library — stack room, reading room and office — occupies the entire lower floor of the library-chapel building. It contains nearly 34,000 volumes and a large number of pamphlets, hitherto inaccessible, but which are being put into good working order as fast as possible. Works of a scientific character predominate, but economics, literature and history are well represented and are receiving due attention. The reading room provides a variety of periodical literature, both technical and popular, encyclopedias and general reference books, and a select collection of works for general reading.

The library is now being reclassified and recatalogued, to make the splendid collection of material here gathered together readily accessible and of the greatest working value. Every effort is being made toward developing the library into a vital intellectual center of college life, of equal value to every student, teacher and teaching department. In consequence, only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced.

Lectures are given to regular and short course students to enable them to make the best use of the library. Emphasis is laid upon the proper use of the card catalogue, periodical indexes, bibliographies and guides; also, in general, assigned and class-room work, and essay and debate work.

The library hours are from 7.45 A.M. to 9 P.M. every week day, and from 9 A.M. to 2 P.M. on Sundays, in term time. Shorter hours prevail during vacations.

MARKET GARDENING. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and a laboratory particularly equipped for floriculture and market gardening. A good library of works on vegetable gardening is available.

MATHEMATICS AND CIVIL ENGINEERING. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 3 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 2 wye levels, a dumpy level, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

MILITARY SCIENCE. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

PHYSICAL EDUCATION. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The room used for exercise and recreation is equipped with modern developing apparatus and two hand-ball courts, and is large enough for basket ball. The apparatus can quickly be removed to clear the floor. An out-door board track enables students to secure track practice through the winter. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a bathroom. The gymnasium is open from 9 A.M. to 10 P.M., and exercise may be taken at such hours as do not conflict with military drill or physical education classes. The regulation costume for class exercise consists of a white track suit and white, rubber-sole shoes.

POMOLOGY. — The department of pomology has 10 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There is also a commercial vineyard and a smaller one; in these are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also extensive nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples and plums in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1909–10, for instance, apples for class use were received from British Columbia, Ontario, Quebec, Nova Scotia, Iowa, Wisconsin, Michigan, Connecticut, New York, Oklahoma, Kansas, Colorado, Oregon, New Jersey and Vermont, besides collections of grapes from California and citrous fruit from Florida and Texas.

PHYSICS. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

Poultry Husbandry. — The poultry plant consists of about 9 acres of land sloping gently to the west. The soil is a fine, rich, sandy loam, well drained. At present the buildings consist of an incubator cellar 22 by 34 feet, with a capacity of 4,000 eggs, over which is a demonstration building; a pipe brood house (open-pipe system) 14 by 72 feet, which will accommodate 1,200 chickens; a long laying house 14 by 180 feet (when completed), which will accommodate 500 layers and furnish facilities for student work in pen management; the 6 old experiment station buildings, each 12 by 18 feet, to be used as breeding houses, and 11 colony brooder houses. Instruction in this department is given in the form of lectures, demonstrations and practical work. The practical work consists of poultry, carpentry, caponizing, killing, picking, dressing, packing and selling poultry; pen management and fattening; running incubators and brooders, etc. At present the stock consists of Barred Plymouth Rocks, White Plymouth Rocks, White Wyandottes, Columbian Wyandottes, single-comb Rhode Island Reds, Light Brahmas, Buff Orpingtons and single-comb White Leghorns. The aim of the department is to keep good specimens of all the most popular varieties of chickens, ducks and geese, so that a thorough course in poultry judging may be given, and that visitors may find the inspection of our stock an education in itself.

Public Speaking. — In connection with the work in public speaking, three regular contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests furnish a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Intercollege contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the College Debating Club.

VETERINARY SCIENCE AND BACTERIOLOGY. — The department of veterinary science and bacteriology occupies a modern laboratory and hospital stable; built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There are a lecture hall, a museum, a demonstration room, a photographing room and a work shop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in bacteriology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

ZOÖLOGY. — The college offers increased facilities for the study of zoölogy. In the new building for entomology, zoölogy and geology are spacious laboratories for both undergraduate and graduate work. On the first floor is a large sophomore laboratory, 27 by 100 feet, with a present seating capacity of 100 persons. Adjoining this is a smaller room, 20 by 27 feet, for junior and senior courses. On the second floor is a laboratory, 20 by 32 feet, for advanced work. All laboratories are equipped with gas. The equipment consists of 80 compound microscopes and accessories, 70 dissecting microscopes, microtomes and accessories, paraffine baths, incubator, dissecting instruments, glassware and other necessary apparatus. Small aquaria and vivaria will be added.

The large amphitheater lecture hall is used jointly by the departments of entomology and zoölogy-geology. It is equipped with charts and models. The zoölogical museum is drawn upon at all times for illustrative material. The zoölogical museum is 27 by 48 feet. The main room is on the first floor of the building. Above this, on a level with the second floor, is a large gallery. On the main floor are 8 large wall cases and 5 large floor cases for exhibition purposes. The gallery has 1 large wall case and 2 floor cases, with space for 10 additional cases. The zoölogical collection consists of nearly 12,000 specimens. All the chief phyla are represented. Adjoining the museum is a preparator's room for the curator. The museum is open to the public from 1 to 5 P.M. on Saturdays, and on other week days from 3 to 5 P.M. The curator is Assistant Professor Gordon.

Prizes awarded for the Year 1911.

Grinnell Prizes. — First prize, $25, Herman Alfred Pauly; second prize, $15, Robert Delano Lull; third prize, $10, Nathaniel Herbert Hill. The Macmillan Prize in Agriculture, consisting of one set of the "Cyclopedia of American Agriculture," to be awarded to the member of the junior class writing the best essay on any subject covered by the work of the division of agriculture: prize awarded to Mr. Howard Archibald Turner, 1912.

Botanical Prizes. — For the best herbarium submitted by a member of the sophomore class, $5, Mr. Lewis Floyd Drury.

General Improvement Prize. — Given to that member of the sophomore class who, during his first two years in college, has shown the greatest improvement in scholarship, character, and example; $25, Mr. Nils Paul Larsen.

Military Honors. — The following-named cadet officers have been reported to the Adjutant-General of the United States army and to the Adjutant-General of the Commonwealth of Massachusetts as being efficient in military science and tactics, the first five graduating as honor men in the military department and the next five as distinguished graduates in the department. Honor graduates: Cadet Col. Samuel Raynolds Parsons; Cadet Maj. Allyn Parker Bursley; Cadet Maj. Harold Francis Willard; Cadet Capt. Arthur Harris Sharpe; Cadet Capt. Percy William Pickard. Distinguished graduates: Cadet Capt. Irving Craig Gilgore; Cadet Capt. Edward Arthur Larrabee; Cadet Capt. Frederick Adams McLaughlin; Cadet Capt. Herbert Jonathan Baker; Cadet First Lieut. Phileas Armand Racicot.

Secretaries of Alumni Associations and Classes.

Alumni Secretaries' Association of the Massachusetts Agricultural College.

Secretary: Ralph J. Watts, 1907, Amherst, Mass.

Associate Alumni of the Massachusetts Agricultural College.
Secretary: Sidney B. Haskell, 1904, Amherst, Mass.

Local Alumni Association of the Massachusetts Agricultural College.
Secretary: Sidney B. Haskell, 1904, Amherst, Mass.

Alumni Club of Massachusetts.
Clerk: H. Linwood White, 1909, 136 State House, Boston, Mass.

Connecticut Valley Association of the Massachusetts Agricultural College.
Secretary: Charles L. Brown, 1894, 870 State Street, Springfield, Mass.

Massachusetts Agricultural College Club of New York.
Secretary: John Ashburton Cutter, 1882, 262 West 77th Street, New York, N. Y.

Massachusetts Agricultural College Club of Washington, D. C.
Secretary: Clarence H. Griffin, 1904, Washington, D. C.

Western Alumni Association of the Massachusetts Agricultural College.
Secretary: Charles A. Tirrell, 1906, 4012 Perry Street, Chicago, Ill.

Massachusetts Agricultural College Pacific Coast Alumni Association.
Secretary: Thomas F. Hunt, 1905, Berkeley, Cal.

Class Secretaries.

Class of	SECRETARY.	Secretary's Address.
1871	E. E. Thompson, . .	5 Jaques Avenue, Worcester, Mass.
1872	S. T. Maynard, . .	Northborough, Mass.
1873	C. Wellington, . .	Amherst, Mass.
1874	D. G. Hitchcock, . .	Warren, Mass.
1875	M. Bunker, . . .	Newton, Mass.
1876	C. Fred Deuel, . .	Amherst, Mass.
1877	Atherton Clark, . .	Newton, Mass.
1878	C. O. Lovell, . . .	5 Bromfield Street, Boston, Mass.
1879	R. W. Swan, . . .	41 Pleasant Street, Worcester, Mass.
1880	Alvan Fowler, . .	413 Post Office Building, Philadelphia, Pa.
1881	J. L. Hills, . . .	55 North Prospect Street, Burlington, Vt.
1882	G. D. Howe, . . .	25 Winter Street, Bangor, Me.
1883	J. B. Lindsey, . .	Amherst, Mass.
1884	– –	– –
1885	E. W. Allen, . . .	1923 Biltmore Street, Washington, D. C.
1886	Dr. Winfield Ayres, .	616 Madison Avenue, New York City.
1887	F. H. Fowler, . .	Shirley, Mass.
1888	H. C. Bliss, . . .	14 Mechanic Street, Attleborough, Mass.
1889	C. S. Crocker, . .	2453 Carpenter Street, Philadelphia, Pa.
1890	David Barry, . .	Amherst, Mass.
1891	H. T. Shores, . . .	117 Elm Street, Northampton, Mass.
1892	H. M. Thomson, . .	Amherst, Mass.
1893	F. A. Smith, . . .	Turner Hill, Ipswich, Mass.
1894	S. F. Howard, . .	Amherst, Mass.
1895	E. A. White, . . .	Amherst, Mass.
1896	A. S. Kinney, . .	South Hadley, Mass.
1897	C. A. Peters, . . .	Amherst, Mass.
1898	– –	– –
1899	D. A. Beaman, . .	Rio Piedras, Porto Rico.
1900	E. K. Atkins, . . .	15 Hubbard Avenue, Northampton, Mass.
1901	J. H. Chickering, . .	Dover, Mass.
1902	H. L. Knight, . .	United States Department of Agriculture, Washington, D. C.
1903	G. D. Jones, . . .	North Amherst, Mass.
1904	P. F. Staples, . . .	North Grafton, Mass.
1905	P. F. Williams, . .	Auburn, Ala.
1906	Richard Wellington, .	Geneva, N. Y.
1907	J. N. Summers, . .	48 Copeland Street, Campello, Mass.
1908	J. A. Hyslop, . . .	Bureau of Entomology, Washington, D. C.
1909	C. S. Putnam, . .	Walpole, N. H.
1910	F. L. Thomas, . .	Amherst, Mass.
1911	L. M. Johnson, . .	Newtown, Conn.

DEGREES CONFERRED AND ROLL OF STUDENTS.

Degrees Conferred—1911.

Doctor of Philosophy.

Shaw, Jacob Kingsley, North Amherst, University of Vermont, B.Sc., Massachusetts Agricultural College, M.Sc., 1908.

Summers, John Nicholas, Campello, Massachusetts Agricultural College, B.Sc., 1907.

Master of Science.

Smith, Philip Henry, Amherst, Massachusetts Agricultural College, B.Sc., 1897.

Whitmarsh, Raymond Dean, Amherst, Massachusetts Agricultural College, B.Sc., 1908.

Bachelor of Science (B.Sc.).

Adams, James Fowler,	Melrose.
Allen, Park West,	Westfield.
Baker, Herbert Jonathan,	Selbyville, Del.
Barrows, Raymond Corbin,	Stafford Springs, Conn.
Bentley, Arnold Gordon,	Hyde Park.
Blaney, Herbert Wardwell,	Swampscott.
Brown, Edgar Morton,	Merrick.
Bursley, Allyn Parker,	West Barnstable.
Conant, Arthur Theodore,	Sunderland.
Damon, Charles Murray,	Haydenville.
Davis, Egbert Norton,	South Framingham.
Davis, Irving Wilder,	Lowell.
Gilgore, Irvin Craig,	Central Square, N. Y.
Hill, Nathaniel Herbert,	Princeton, N. J.
Jenks, Albert Roscoe,	Three Rivers.
Johnson, Leonard Matthews,	Easthampton.
Labouteley, Gaston Edward,	Lynn.
Larrabee, Edward Arthur,	Medford.
Lull, Robert Delano,	Windsor, Vt.
McGraw, Frank Dobson,	Fall River.
McLaughlin, Frederick Adams,	Lee.
Morse, Henry Bowditch,	Salem.
Nagai, Isaburo,	Tokyo, Japan.
Nickerson, George Payne,	Amherst.
Nielsen, Gustaf Arnold,	West Newton.
Ostrolenk, Bernhard,	Gloversville, N. Y.
Parsons, Samuel Raynolds,	North Amherst.

Patch, Roland Harrison,	Wenham.
Pauly, Herman Alfred,	Plainfield, Vt.
Pickard, Percy William,	Hopedale.
Piper, Ralph Waldo,	South Acton.
Prouty, Philip Herman,	Shrewsbury.
Racicot, Phileas Armand,	Lowell.
Robinson, Ralph Cushing,	Boston.
Sharpe, Arthur Harris,	Saxonville.
Smith, Clarence Albert,	Northampton.
Smith, Raymond Goodale,	Lynn.
Stevenson, Lomas Oswald,	Hackensack, N. J.
Titus, Willard McCready Snow,	New Braintree.
Warren, Edward Erving,	Leicester.
Whitney, Raymond Lee,	Brockton.
Willard, Harold Francis,	Leominster.
Winn, Ervin Lawrence,	Holden.

ROLL OF STUDENTS.

SENIOR CLASS.

Ackerman, Arthur John,	Worcester,	7 South College.
Baker, Horace Mitchell,	Selbyville, Del.,	South College Tower.
Beals, Carlos Loring,	Sunderland,	5 South College.
Beers, Rowland Trowbridge,	Billerica,	8 North College.
Bent, William Richard,	Marlborough,	2 North College.
Bodfish, Edward Hill,	West Barnstable,	Plant House.
Boland, Eric Nichols,	South Boston,	17 South College.
Brett, Alden Chase,[1]	North Abington,	81 Pleasant Street.
Brown, Merle Raymond,	Greenwich Village,	92 Main Street, Amherst.
Burr, Frederick Huntington,	Worthington,	88 Pleasant Street.
Caldwell, Lawrence Sanborn,	Lynnfield Center,	Kappa Sigma House.
Carpenter, Jesse, Jr.,[1]	Attleborough,	Kappa Sigma House.
Castle, Fred Arlo,	Roseburg, Ore.,	13 South College.
Clapp, Raymond Kingsley,	Westhampton,	Theta Chi House.
Curran, Daniel Joseph,	Marlborough,	2 North College.
Deming, Winfred Griswold,	Wethersfield, Conn.,	16 South College.
Dodge, Albert Wesley,[1]	Hamilton,	14 North College.
Fagerstrom, Leon Emanuel,	Worcester,	12 South College.
Fisherdick, Warren Francis,	Amherst,	26 South Pleasant Street.
Fitts, Frank Orus,	North Amherst,	Chemical Laboratory.
Fitzgerald, John Joseph,	Holyoke,	75 Pleasant Street.
Fowler, George Scott,	Wayland,	44 Pleasant Street.
Gallagher, James Andrew,	North Wilmington,	3 North College.
Gaskill, Lewis Warren,	Hopedale,	6 South College.
Gelinas, Louis Edmond,	North Adams,	4 South College.
Gibbs, Robert Morey,	Chester,	Plant House.
Gibson, Lester Earl,	Melrose,	Kappa Sigma House.
Gray, Frank Leonard,	East Boston,	21 Fearing Street.
Hall, Henry Bass,[1]	Northampton,	Paradise Road.
Hall, Horace Whitney,[1]	Newton Center,	P. O. Building, Amherst.
Hallowell, Royal Norton,	Jamaica Plain,	South College Tower.
Hamblin, Stephen Francis,	Marston Mills,	94 Pleasant Street.
Harlow, Joseph Alvin,	Turners Falls,	Kappa Sigma House.
Heald, Jay Morrill,	Watertown,	10 South College.
Hemenway, Thomas,	Nashua, N. H.,	17 South College.
Hickey, Francis Benedict,[1]	Brockton,	C. S. C. House.
Hills, Frank Burrows,[1]	Bernardston,	8 South College.
Holland, Henry Lucine,	Amherst,	28 North Prospect Street.
Hubert, Benjamin Franklin,	White Plains, Ga.,	48 E. Pleasant Street.
Kingsbury, Arthur French,	Medfield,	Theta Chi House.
Lamson, Robert Ward,	Amherst,	51 Pleasant Street.
Lin, Dau Yang,	Shanghai, China,	21 Fearing Street.
Lodge, Charles Albert,	Manchester,	87 Pleasant Street.
Lloyd, Edward Russell,[1]	Boston,	15 North College.
Madison, Francis Spink,	East Greenwich, R. I.,	Veterinary Laboratory.
Martin, James Francis,	Amherst,	19 South East Street.
McGarr, Thomas Anthony,	Worcester,	3 North College.
Merkle, George Edward,	Amherst,	North East Street.
Merrill, Fred Sawyer,	Danvers,	C. S. C. House.
Moreau, Theodore Joseph,	Turners Falls,	10 South College.

---

[1] Work incomplete.

Mueller, Alfred Frederick,	Jamaica Plain,	4 South College.
Noyes, Harry Alfred,	Marlborough,	79 Pleasant Street.
O'Flynn, George Bernhard,	Worcester,	Kappa Gamma Phi House.
Parker, Ralph Robinson,	Malden,	C. S. C. House.
Pearson, Charles Cornish,	Arlington,	18 South College.
Peckham, Curtis,	New Bedford,	7 North College.
Philbrick, William Edwin,	Taunton,	18 South College.
Pierpont, John Edwards,	Williamsburg,	C. S. C. House.
Pratt, Marshall Cotting,	Holderness, N. H.,	Kappa Sigma House.
Puffer, Stephen Perry,	North Amherst,	8 North College.
Raymond, Arthur Nathaniel,	Leominster,	9 North College.
Reed, Robert Edward,[1]	Abington,	Theta Chi House.
Robinson, Earle Johnson,[1]	Hingham,	8 South College.
Rockwood, Lawrence Peck,	Waterbury, Conn.,	116 Pleasant Street.
Sanctuary, William Crocker,	Amherst,	Mill Valley.
Sellew, Lewis Raymond,	Natick,	Plant House.
Shaw, Ezra Ingram,	Amherst,	East Street.
Southwick, Benjamin Gilbert,	Buckland,	11 North College.
Stack, Herbert James,	Conway,	French Hall.
Terry, Leon,[1]	Springfield,	12 North College.
Torrey, Ray Ethan,	North Leverett,	Clark Hall.
Tower, Daniel Gordon,	Roxbury,	15 South College.
Tupper, George Wilbur,	Roxbury,	C. S. C. House.
Turner, Howard Archibald,	Dorchester,	Plant House.
Wales, Robert Webster,	North Abington,	Kappa Sigma House.
Walker, Herman Chester,	Marlborough,	16 South College.
Warner, Roger Andrew,[1]	Sunderland,	Theta Chi House.
Weaver, William Jack,	Alandar,	15 North College.
Whitney, Charles Everett,	Wakefield,	10 North College.
Wilbur, Emory Sherman,	East Wareham,	79 Pleasant Street.
Wilde, Earle Irving,	Taunton,	2 South College.
Williams, Edward Roger,	Concord,	12 South College.
Williams, Silas,	Fall River,	Theta Chi House.
Wood, Howard Holmes,	Shelburne Falls,	15 South College.
Young, Edwin Burnham,	Dorchester,	11 North College.

JUNIOR CLASS.

Adams, Winfred Frederic,[1]	East Leverett,	83 Pleasant Street.
Allen, Harry Willis,	Amherst,	South Street, West Pelham.
Anderson, Oscar Gustaf,[1]	East Pepperell,	Entomological Building.
Angier, Harris William,	Westborough,	88 Pleasant Street.
Baird, Harry Albert,[1]	Somerville,	29 Lincoln Avenue.
Baker, Dean Foster,	Fairhaven,	116 Pleasant Street.
Barber, George Ware,[1]	Franklin,	13 North College.
Bevan, Lawrence Algur,[1]	Newtonville,	84 Pleasant Street.
Blake, Ralph Cedric,[1]	Wollaston,	President's House, M. A. C.
Birdsall, Webster Jennings,[1]	Otego, N. Y.,	Kappa Sigma House.
Borden, Ralph James,	Fall River,	7 North College.
Brewer, Charlesworth Herbert,	Mt. Vernon, N. Y.,	C. S. C. House.
Brown, Herbert Augustine,[1]	Saxonville,	Brooks Farm.
Burby, Lawrence Walter,[1]	Chicopee Falls,	88 Pleasant Street.
Bursley, Harold Barrows,	Peabody,	Theta Chi House.
Caldwell, David Story,	South Byfield,	9 North College.
Carver, John Stuart,	Roslindale,	C. S. C. House.
Chun, Woon Young,[1]	Shanghai, China,	90 Pleasant Street.
Clark, Norman Russell,[1]	Worcester,	Theta Chi House.
Cobb, Joseph Boyd,[1]	Chicopee Falls,	5 North College.
Cole, Arlin Tower,	West Chesterfield,	Pease Avenue, care of Mr. Reed.
Cole, Flora Atwood,	Newton,	10 Draper Hall.
Coleman, Isaac[1],	Amherst,	12 North College.

---

[1] Work incomplete.

Cooper, Everett Hanson,	Wakefield,	14 North College.
Cory, Harold,[1]	Rutherford, N. J.,	15 Beston Street.
Covill, Joseph Warren,[1]	West Roxbury,	7 South College.
Cristman, Clyde Edward,	Dalton,	Pease Avenue, care of Mr. Reed.
Culley, Frank Hamilton,	Marshalltown, Ia.,	77 Pleasant Street.
Curtis, Harold William,	Belchertown,	Entomological Building.
Daniel, Edward Stephen Coen,	Osterville,	15 Fearing Street.
Dayton, James Wilson,	South Norwalk, Conn.,	15 Beston Street.
Dooley, Thomas Patrick,[1]	South Boston,	35 East Pleasant Street.
Drury, Lewis Floyd,	Rutland,	120 Pleasant Street.
Edminster, Albert Franklin,	Brooklyn, N. Y.,	5 South College.
Eisenhaure, John Louis,[1]	North Reading,	Brooks Farm.
Ellis, Benjamin Ward,	Plymouth,	Clark Hall.
Ells, Gordon Waterman,	Haverhill,	116 Pleasant Street.
Fay, Robert Sedgwick,	Monson,	84 Pleasant Street.
Forbush, Wallace Clifford,	Rutland,	79 Pleasant Street.
French, James Dudley,	Hyde Park,	116 Pleasant Street.
Gaskill, Ralph Hicks,	Amherst,	15 Hallock Street.
Godvin, Thomas Joseph,[1]	Jamaica Plain,	75 Pleasant Street.
Gore, Harold Martin,	Wollaston,	11 South College.
Greenleaf, George Freeman,[1]	Brockton,	21 Fearing Street.
Griggs, Frederick David,	Chicopee Falls,	5 North College.
Harris, Burton Adams,	Wethersfield, Conn.,	84 Pleasant Street.
Hasey, Willard Harrison,[1]	Campello,	87 Pleasant Street.
Hatch, Herbert Tilden,	Beverly,	East Experiment Station.
Headle, Herbert Wallace,	Bolton,	Plant House.
Headle, Marshall,	Bolton,	Plant House.
Holden, James Loomis,	Palmer,	5 McClellan Street.
Howe, Glover Elbridge,	Marlborough,	11 South College.
Howe, Ralph Wesley,	East Dover, Vt.,	Wilder Hall.
Huntington, Samuel Percy,	Lynn,	96 Pleasant Street.
Hutchings, Herbert Colby,	South Amherst,	87 Pleasant Street.
Hyland, Harold Wilson,[1]	Weymouth,	Old Insectary.
Jones, Harold Frederick,	Campello,	West Experiment Station.
Jordan, Simon Miller,	Rutherford, N. J.,	9 South College.
Kelley, Albert Joseph,	Roxbury,	35 East Pleasant Street.
Kelley, Bernard Jenkins,[1]	Harwichport,	Brooks Farm.
Kenney, Frederick Alfred,[1]	Charlestown,	Theta Chi House.
Larsen, Nils Paul,	Bridgeport, Conn.,	Clark Hall.
Lesure, John Warren Thomas,	Fitchburg,	94 Pleasant Street.
Little, Willard Stone,	Newburyport,	66 Pleasant Street.
Lowry, Quincy Shaw,[1]	Canton,	6 South College.
Lundgren, Arthur Robert,	Orange,	Theta Chi House.
Lyon, Harold,	Somerville,	13 Phillips Street.
Macone, Joseph Augustine,	Concord,	1 North College.
Mallett, George Alfred,	Bridgeport, Conn.,	13 North College.
Matz, Julius,[1]	Boston,	112 Pleasant Street.
Mayer, John Lawrence,	South Boston,	35 East Pleasant Street.
McDougall, Allister Francis,	Westford,	6 North College.
Moir, William Stuart,	Boston,	Theta Chi House.
Murray, Joseph Wilbur,	Holyoke,	96 Pleasant Street.
Neal, Ralph Thomas,	Mattapan,	Old Insectary.
Nichols, Norman Joseph,	Everett,	Mathematics Building.
O'Brien, James Leo,[1]	Wayland,	19 Hallock Street.
Packard, Clyde Monroe,	Springfield,	Cottage Hospital, Kellogg Avenue.
Pease, Lester Newton,	Meriden, Conn.,	84 Pleasant Street.
Pillsbury, Joseph James,[1]	West Bridgewater,	8 South Prospect Street.
Post, George Atwell,[1]	Richmond Hill, N. Y.,	Theta Chi House.
Roberts, Clarence Dwight,[1]	Edinburgh, Scot.,	Brooks Farm.
Roehrs, Herman Theodore,[1]	New York, N. Y.,	Kappa Sigma House.

---

[1] Work incomplete.

Rosebrooks, Walter Edwin,	Millbury,	15 Hallock Street.
Samson, Stuart Dodds,	Grand Isle, Vt.,	Kappa Sigma House.
Selden, John Lincoln,[1]	Northampton,	6 Ahwaga Avenue, Northampton.
Serex, Paul, Jr.,	Jamaica Plain,	116 Pleasant Street.
Sheehan, Dennis Anthony,[1]	South Lincoln,	1 North College.
Shute, Carl August,[1]	Hampden,	14 South College.
Streeter, Charles Marsh,	Brimfield,	79 Pleasant Street.
Thayer, Clark Leonard,	Enfield,	West Experiment Station.
Tucker, Waldo Guy,	Lynn,	Mathematics Building.
Tupper, Arthur Somerville,	Roxbury,	C. S. C. House.
Van Zwaluwenburg, Reyer Herman,	Rutherford, N. J.,	East Experiment Station.
Walker, Charles Dexter,	Greenwich Village,	14 South College.
Whitney, Francis Wellington,[1]	Wellesley,	4 North College.
Zabriskie, George 2d,[1]	New York City,	83 Pleasant Street.

SOPHOMORE CLASS.

Abbott, Leslie Elmer,	Sandwich,	Care of Mr. E. F. Gaskill.
Allen, Carl Murdough,	Holyoke,	87 Pleasant Street.
Allen, Henry Dickinson,[1]	Lynn,	82 Pleasant Street.
Anapolsky, Morris,[1]	Boston,	11 Amity Street.
Anderson, Leslie Oscar,[1]	Concord,	7 Nutting Avenue.
Baker, Warren Sears,[1]	Wollaston,	116 Pleasant Street.
Besser, Sidney Stokes,	Gilbertville,	3 Nutting Avenue.
Black, Harold Cotting,[1]	Falmouth,	3 Pleasant Street,
Bokelund, Chester E.,[1]	Worcester,	66 Pleasant Street.
Bragg, Ralph Stanley,	Milford,	Mt. Pleasant, care of Professor White.
Brewer, Harold William,[1]	Mount Vernon, N. Y.,	C. S. C. House.
Brooks, Arthur Winslow,	Enfield,	Chemical Laboratory.
Brown, Harry Dunlap,	Lowell,	82 Pleasant Street.
Bullard, Alvan Henry,	South Framingham,	5 McClellan Street.
Calvert, Melville Bradford,[1]	New London, Conn.,	56 Pleasant Street.
Campbell, Malcolm David,	Still River,	35 East Pleasant Street.
Christie, Edward Wheeler,	North Adams,	29 Lincoln Avenue.
Churchill, George Clarence,	Worcester,	58 Pleasant Street.
Clark, Ernest Samuel, Jr.,	Tolland,	82 Pleasant Street.
Clay, Harold Johnson,	North Cambridge,	21 Fearing Street.
Clegg, Frank Jackson,	Fall River,	C. S. C. House.
Coe, Alfred Lyne,	Cazenovia, N. Y.,	79 Pleasant Street.
Cole, Herbert Elmer,[1]	Manchaug,	Plant House.
Coleman, David Augustus,	South Framingham,	108 Pleasant Street.
Damon, Samuel Reed,[1]	Kingston, R. I.,	Kappa Sigma House.
Davies, Lloyd Garrison,[1]	Peabody,	75 Pleasant Street.
Davis, Ralph Edward,	Southbury, Conn.,	77 Pleasant Street.
Davis, William Ashmun,	Sunderland,	79 Pleasant Street.
Dearing, Newton Howard,	Brookline,	7 Nutting Avenue.
Demond, Robert Norton,	North Adams,	Care of Mr. E. H. Forristall.
Dexter, Evans King,	Mattapoisett,	31 East Pleasant Street.
Dunbar, Erving Walker,	North Weymouth,	7 Nutting Avenue.
Edgerton, Almon Morley,[1]	West Springfield,	6 Nutting Avenue.
Edwards, Edward Clinton,[1]	Salem,	Nutting Avenue, care of R. J. Watts.
Eldridge, Harold Lockwood,	Wareham,	North College, College Store.
Foster, Stuart Brooks,[1]	West Somerville,	96 Pleasant Street.
Freeborn, Stanley Barron,	Ware,	116 Pleasant Street.
Freedman, Samuel Leavitt,	Roxbury,	101 Pleasant Street.
Frost, Robert Theodore,	New York, N. Y.,	85 Pleasant Street.
Frye, Carl Raymond,	South Hadley Falls,	116 Pleasant Street.
Fuller, George,	Deerfield,	86 Pleasant Street.
Gibson, David Wyman,	Groton,	116 Pleasant Street.
Grebin, Mark Anthony,[1]	North Hadley,	North Hadley.

---

[1] Work incomplete.

Griffin, William Gerald,	South Hadley Falls,	35 East Pleasant Street.
Hadfield, Harold Frederick,	North Adams,	29 Lincoln Avenue.
Handy, Ralph Ellis,	Cataumet,	10 North College.
Harris, Rodney Wells,	Wethersfield, Conn.,	77 Pleasant Street.
Hayden, William Vassall,[1]	Beverly,	13 South College.
Hazen, Edward Leonard,	Springfield,	Care of Mr. E. H. Forristall.
Heath, Chester Blanchard,	Needham,	4 North College.
Hebard, Emory Blodgett,	Holland,	3 Fearing Street.
Heffron, Frederick,	Sherborn,	108 Pleasant Street.
Hogg, Lawrence Jagger,	Lawrence,	13 Fearing Street.
Howard, Lewis Phillips,	North Easton,	19 Hallock Street.
Hutchinson, John Gouvernour,	Arlington,	8 Allen Street.
Hutchinson, Raymond Ernest,[1]	South Hanson,	35 East Pleasant Street.
Ingham, Earl Morris,	Granby,	86 Pleasant Street.
Jacobs, Loring Humphrey,	Wellesley,	25 Pleasant Street.
Jenney, Herbert Hedge,	South Boston,	6 Nutting Avenue.
Johnson, Rollin Eugene,	Templeton,	120 Pleasant Street.
Jones, Dettmar Wentworth,	Melrose,	66 Pleasant Street.
Kilbourn, Walton Goss,	South Lancaster,	85 Pleasant Street.
Kriebel, Addison Reiff,[1]	Norristown, Pa.,	81 Pleasant Street.
Leach, Benjamin Robert,	Methuen,	13 Phillips Street.
Leete, Richard Fowler,	Mount Kisco, N. Y.,	66 Pleasant Street.
Levine, Henry Walter,	Roxbury,	101 Pleasant Street.
Lincoln, Murray Danforth,	North Raynham,	19 Hallock Street.
Lucas, Hoyt Dennis,	West Springfield,	1 Allen Street.
MacDonald, Daniel Alfred,[1]	Walpole,	67 Pleasant Street.
Major, Joseph,	Rutherford, N. J.,	58 Pleasant Street.
Melloon, Ralph Reid,	Lowell,	Mt. Pleasant, care of Mr. Greene.
Merkle, Frederick Grover,	Amherst,	North East Street.
Morrison, Harold Ivory,	Melrose,	77 Pleasant Street.
Morse, Harold John,[1]	Townsend,	75 Pleasant Street.
Needham, Lester Ward,[1]	Springfield,	Kappa Sigma House.
Nicolet, Tell William,	Fall River,	85 Pleasant Street.
Nicolet, Theodore Arthur,[1]	Fall River,	85 Pleasant Street.
Nissen, Harry,	Boston,	85 Pleasant Street.
Norton, Leslie Howard,	Newport, R. I.,	79 Pleasant Street.
Nute, Raymond Edwin,	Fall River,	9 Fearing Street.
Oertel, John Thomas,[1]	South Hadley Falls,	116 Pleasant Street.
Palmer, John Philip,[1]	Portsmouth, N. H.,	Care of President Butterfield.
Parker, Ervine Franklin,	Poquonock, Conn.,	81 Pleasant Street.
Payne, Roland Alfred,	Wakefield,	North Amherst.
Pellett, John Doubleday,	Worcester,	Theta Chi House.
Peters, Chester Harry,	Brown Station, N. Y.,	116 Pleasant Street.
Petersen, Peverill Oscar,	Concord,	7 Nutting Avenue.
Porter, Bennett Allen,	Amherst,	R. D. 1, No. 25, Amherst.
Powers, Richard Henry,[1]	Malden,	9 South College.
Read, Frederick William,	Boston,	7 Nutting Avenue.
Rees, Harry Launcelot,	Monson,	3 Fearing Street.
Reid, George Alexander,	Worcester,	52 Lincoln Avenue.
Robinson, Herbert Calvin,	Haverhill,	75 Pleasant Street.
Russell, Alden Hesseltine,	Watertown,	7 Nutting Avenue.
Sahr, Gabriel Arthur,[1]	Boston,	60 Pleasant Street.
Sanford, Clarence Higgins,	Allston,	Cottage Hospital, Kellogg Avenue.
Sherman, Joel Powers,	Hyannis,	4 North College.
Shirley, John Newton,	South Duxbury,	30 North Prospect Street.
Simmons, George Walker,[1]	Amsterdam, N. Y.,	35 East Pleasant Street.
Slein, Owen Francis,	New Braintree,	9 Nutting Avenue.
Small, Francis Willard,[1]	North Truro,	35 North Prospect Street.
Smith, Leon Edgar,	Brighton,	85 Pleasant Street.

---

[1] Work incomplete.

Smith, Leone Ernest,	Leominster,	116 Pleasant Street.
Stevens, Arthur Eben,	Brockton,	79 Pleasant Street.
Strange, Sarah Josephine,	Marshfield,	6 Draper Hall.
Sullivan, Arthur James,	Rochester, N. Y.,	19 Hallock Street.
Tarbell, Munroe Gifford,	Brimfield,	College Store, North College.
Taylor, Arthur Wright,	Feeding Hills,	13 Fearing Street.
Taylor, Leland Hart,	Peabody,	75 Pleasant Street.
Thurston, Arthur Searle,	Everett,	9 Fearing Street.
Tower, Alfred Leigh,	Sheffield,	120 Pleasant Street.
Tsang, Oong Hyuen,	Shanghai, China,	26 Lincoln Avenue.
Upton, Ernest Franklin,	Salem,	Nutting Avenue, care of R. J. Watts.
Walker, Nathaniel Kennard,	Malden,	83 Pleasant Street.
Walker, Raymond Philip,	Taunton,	120 Pleasant Street.
Warner, Raymond Winslow,	Sunderland,	Care of Mr. E. H. Forristall.
Webster, Louis Armstrong,	Blackstone,	82 Pleasant Street.
Weigel, Arthur George,	Lawrence,	13 Hallock Street.
Wells, Nathan Holmes,[1]	Kennebunk, Me.,	Prospect House.
Wheeler, Chester Eaton,	Lowell,	87 Pleasant Street.
Whidden, Burton Clark,	Waltham,	81 Pleasant Street.
Whippen, Charles Warren,	Lynn,	13 Phillips Street.
White, Samuel Alexander,	Boston,	12 Hallock Street.
Williams, George Edward,[1]	Belchertown,	Belchertown.
Wing, John Govan,	Somerville,	116 Pleasant Street.
Wood, Henry Joseph,	Mendon,	82 Pleasant Street.
Wooley, Harold Curtis,[1]	Malden,	Kappa Sigma House.

Freshman Class.

Alden, Charles Harold,	Amherst,	East Pleasant Street.
Allen, Francis Ellwood,	Melrose,	10 Allen Street.
Anderson, Herbert Henry,	Ware,	13 Hallock Street.
Archibald, Herbert Hildreth,	Waltham,	120 Pleasant Street.
Baird, Earle Fairbank,	Waltham,	120 Pleasant Street.
Banister, Seth Warren,	Westford,	30 North Prospect Street.
Barnes, Dwight Fletcher,	Marshfield,	3 Nutting Avenue.
Bartlett, Emory Haynes,	Enfield,	12 Cottage Street.
Bartlett, Edward Russell,	Newburyport,	66 Pleasant Street.
Bartley, Hastings Newcomb,	Sandwich,	77 Pleasant Street.
Beebe, William Carleton,	Evans Mills, N. Y.,	Prospect House.
Beers, Norman Lauer,	Somerville,	21 Fearing Street.
Bemis, Willard Gilbert,	North Brookfield,	12 Cottage Street.
Bennett, John Ingram,	Boston,	77 Pleasant Street.
Bisbee, Eleanor,	Arlington Heights,	Draper Hall.
Bishop, Chester Allen,	Peterboro, N. H.,	79 Pleasant Street.
Bishop, Herbert Walker,[1]	Doylestown, Pa.,	79 Pleasant Street.
Bittinger, Fritz John,	Plymouth,	96 Pleasant Street.
Boyer, Edward E. Hale,	Lynn,	Northampton Road.
Braley, Merton Loring,	Rock,	East Experiment Station.
Bredemeier, Carl,	Buffalo, N. Y.,	86 Pleasant Street.
Bronson, Harold Julius,	Buckland,	Walker Hall.
Brooks, Gardner Milton,	Newton,	9 Allen Street.
Buttrick, John Willard,	Melrose,	31 North Prospect Street.
Cale, Gladstone Hume,	West Springfield,	79 Pleasant Street.
Callard, John Case,	Winthrop,	40 Amity Street.
Cande, Donald Hopkins,	Pittsfield,	83 Pleasant Street.
Chase, Alexander Baxter, Jr.,	West Barnstable,	13 Fearing Street.
Churchill, Chester Albert,	Brockton,	Angus's Cottage.
Clare, Frederick Henry,	Mattapan,	– –
Clark, Arthur Lincoln,	Jamaica Plain,	35 East Pleasant Street.
Clark, Ellis Fred,	Granby, Conn.,	Theta Chi House.
Clark, George Henry,[1]	Sherborn,	3 Nutting Avenue.

---

[1] Work incomplete.

Clark, Saxon Dickinson,	Springfield,	120 Pleasant Street.
Clough, Maurice Joseph,	Swampscott,	30 North Prospect Street.
Cohen, Samuel Adams,	Roxbury,	101 Pleasant Street.
Dalrymple, Andrew Campbell,	Revere,	3 McClellan Street.
Damon, Leon Blanchard,	Melrose,	31 North Prospect Street.
Darling, Homer Chester,[1]	Mendon,	15 Hallock Street.
Day, George Allen,	Warren,	12 Cottage Street.
Dole, Sumner Alvord,	Bardwell's Ferry,	Walker Hall.
Donnell, George Edwin,	Burlington,	10 Tyler Place.
Doran, William Leonard,	North Dartmouth,	35 East Pleasant Street.
Draper, Earle Sumner,	Milford,	C. S. C. House.
Eaton, Paul Baker,	Wakefield,	83 Pleasant Street.
Estes, Ralph Carey,	Lancaster,	79 Pleasant Street.
Fairbank, Harvey Nathan,	Sudbury,	Care of E. F. Gaskill.
Fales, Gerald,	Worcester,	75 Pleasant Street.
Farrar, Stuart Kittridge,	Springfield,	Kappa Sigma House.
Fisher, Leonard Cyrus,[1]	Norwood,	35 East Pleasant Street.
Fitzgerald, Daniel James,[1]	Worcester,	75 Pleasant Street.
Flebut, Alpha John,	Amherst,	27 McClellan Street.
Fox, Everett Bailey,	Dracut,	East Experiment Station.
Gare, Edward John,	Northampton,	13 Phillips Street.
Gibbs, Robert Burley,	Ballston Spa, N. Y.,	3 Nutting Avenue.
Goodwin, Malcolm Noyes,	Newburyport,	66 Pleasant Street.
Grant, Harold Davidson,	Melrose,	3 McClellan Street.
Griggs, Raymond Bradford,	Chicopee Falls,	84 Pleasant Street.
Hager, Clayton Marden,	Somerville,	9 Nutting Avenue.
Hall, George Morris,	Brookline,	Lincoln Block.
Hall, Roderick Chesley,	Worcester,	29 Pleasant Street.
Harper, James Edward,	New Haven, Conn.,	29 Lincoln Avenue.
Harper, Raymond Wires,	Barre,	Hatch Experiment Barn.
Harvey, Russell Wilton,	Lanesville,	44 Pleasant Street.
Haskell, Willis Henry, Jr.,	Brooklyn, N. Y.,	15 Beston Street.
Haskins, Leroy Everett,	Taunton,	120 Pleasant Street.
Hatfield, William Hollis,	Wellesley,	30 North Prospect Street.
Hathaway, Isaac,	Kingston,	Care of E. F. Gaskill.
Haug, Chester Amos,	New York, N. Y.,	15 Fearing Street.
Hawes, Clayton Prescott,	North Dartmouth,	35 East Pleasant Street.
Heartz, Forrest Oscar,	Melrose Highlands,	35 Amity Street.
Hildreth, Paul Hughes,	Newtonville,	8 Allen Street.
Hill, Charles Chase,	Melrose Higlhands,	Pease Avenue.
Hotis, Ralph P.,	Evans Mills, N. Y.,	52 Amity Street.
Houghton, Arthur Reginald,	South Lancaster,	C. S. C. House.
Hyde, George Frederick,	North Dana,	79 Pleasant Street.
Hyde, Harold Gilmore,	Winchendon,	29 North Prospect Street.
Jackson, John Carleton,	Sherborn,	15 Hallock Street.
Johnson, Arthur,	Bridgeport, Conn.,	Brooks Farm.
Johnson, Bernard Pol,	New York, N. Y.,	College Store, North College.
Jordan, Perley Balch,	Topsfield,	31 North Prospect Street.
Joubert, Sylvester Gordon,	Middletown, Conn.,	31 Lincoln Avenue.
Kane, Paul Vincent,	Worcester,	Brooks Farm.
Karnan, Parker Robert,	Hyde Park,	31 Lincoln Avenue.
Kelliher, Jerome Joseph,	Montague City,	75 Pleasant Street.
Kennedy, Thomas James,	South Hadley Falls,	Brooks Farm.
Kilbon, Ralph Gillette,[1]	Springfield,	19 Pleasant Street.
Komp, William H. Wood,[1]	Rutherford, N. J.,	82 Pleasant Street.
Koplovitz, Samuel,	Chelsea,	112 Pleasant Street.
Lane, Merton Chesleigh,	South Duxbury,	Pleasant Street, care of Mr. Root.
LeDuc, Ashley Cudworth,	Chesterfield,	13 Hallock Street.
Lewis, Daniel James,	Hanson,	120 Pleasant Street.
Lewis, John Kirby,	New Haven, Conn.,	52 Lincoln Avenue.

---

[1] Work incomplete.

Lincoln, Irving Bowin,[1]	Glens Falls, N. Y.,	55 Pleasant Street.
Little, Harold Greenleaf,	Newburyport,	66 Pleasant Street.
Lovejoy, John Sumner,	Newburyport,	12 Cottage Street.
MacDonald, Norman Duncan,[1]	Melrose,	47 Pleasant Street.
MacNeil, Ralph Langdell,	Chelsea,	52 Amity Street.
Macy, Philip Arthur,	Oak Bluffs,	12 Cottage Street.
Mahan, Harold Butterworth,	Boston,	13 Phillips Street.
Marsh, Franklin Winter,	Amherst,	9 Woodside Avenue.
Marsh, Herbert Verner,	Greenfield,	79 Pleasant Street.
Masse, Sidney Merton,	Dorchester,	3 McClellan Street.
McKechnie, Ray Farrar,[1]	Natick,	5 McClellan Street.
McLain, Ralph Emerson,	Melrose,	10 Allen Street.
Melican, George Deady,[1]	Worcester,	66 Pleasant Street.
Moberg, Carl David,	Campello,	5 McClellan Street.
Moberg, Eldon Samuel,	Campello,	5 McClellan Street.
Montague, Enos James,	Northampton,	Nutting Avenue, care of Mr. Plumb.
Moore, Elbert Francis,[1]	Waltham,	81 Pleasant Street.
Moore, Roger Henry,	Beverly,	79 Pleasant Street.
Munger, George Draper,	Worcester,	– –
Murray, John Kean,	Winthrop,	Mt. Pleasant, care of Mr. Greene.
Navas, Miguel,	New York,	56 Pleasant Street.
Norton, Chester Harold,	Chelsea,	2 Allen Street.
Parmenter, Ernest Brigham,	Dover,	79 Pleasant Street.
Patten, Merrill Campbell,	Brighton,	52 Lincoln Avenue.
Patterson, Robert Earley,	Dorchester,	9 Woodside Avenue.
Pendleton, Harlow Libby,	Dorchester,	31 North Prospect Street.
Perkins, Olney Hilton,[1]	Brockton,	55 Pleasant Street.
Perry, Gerald Eugene,	Amherst,	17 Amity Street.
Phillips, Ralph Edward,	Mendon,	15 Hallock Street.
Pike, Joseph Stevens, Jr.,	Somerville,	3 Nutting Avenue.
Poole, Joseph Ellsworth,	Needham,	– –
Po, Shue Lo,	Canton, China,	31 Lincoln Avenue.
Potter, George Raymond,	Ludlow,	1 Allen Street.
Price, James Albert,	New York, N. Y.,	15 Beston Street.
Prouty, Langdon,	Littleton,	35 East Pleasant Street.
Quincy, Knight,	Roslindale,	35 East Pleasant Street.
Ray, George Burrill,	Hingham,	Brooks Farm.
Rendall, Raymond Eaton,	Melrose,	Lincoln Avenue and Amit Street.
Rhoades, Paul Whitney,	Malden,	2 Allen Street.
Rogers, Harold Merriman,	Southington, Conn.,	Mt. Pleasant, care of Professor Sears.
Saben, Maxwell Boehm,	Newport, R. I.,	83 Pleasant Street.
Sauchelli, Vincent,[1]	Waterbury, Conn.,	11 High Street.
Sauter, John Martin,	Turners Falls,	75 Pleasant Street.
Scott, Lincoln Bain,	Melrose,	3 McClellan Street.
Sears, William Richardson,	Arlington,	31 East Pleasant Street.
Severance, Verne Lincoln,	South Hanson,	Pleasant Street, care of Mr. Root.
Seton, George Patrick,	Darien, Conn.,	31 East Pleasant Street.
Shaylor, Fred Wright,[1]	Lee,	Kappa Sigma House.
Sherman, Milton Francis,	South Lincoln,	Dickinson House.
Simon, Isaac Barney,	Revere,	Brooks Farm.
Smith, Francis Albert,[1]	West Newton,	29 McClellan Street.
Smith, Philip Lawrence,[1]	Kingston,	East Experiment Station.
Spofford, Chester Porter,	South Groveland,	66 Pleasant Street.
Strauss, Abraham,[1]	Boston,	101 Pleasant Street.
Taft, Richard Craig,	Oxford,	88 Pleasant Street.
Tarr, Lester Winslow,	Rockport,	44 Pleasant Street.
Thayer, Granville Martyn,	South Hanson,	15 Beston Street.

---

[1] Work incomplete.

Tonry, Albert Joseph,	Winthrop,	17 South College.
Tower, William Reginald,	Sheffield,	120 Pleasant Street.
Tower, Ralph Ernest,	Becket,	Brooks Farm.
Towne, Edwin Chester,	Waltham,	19 Pleasant Street.
Upton, Raymond Melville,	Peabody,	19 Hallock Street.
Vinal, Stuart Cunningham,	East Weymouth,	8 Allen Street.
Warner, Lewis Pomeroy,[1]	Sunderland,	13 Phillips Street.
Weed, Frank Hammond,[1]	Great Neck, L. I.,	83 Pleasant Street.
Wellington, Benjamin,	Waltham,	Care of E. F. Gaskill.
White, Homer Beethoven,	Melrose,	35 South Pleasant Street.
White, Harry Dexter,	Boston,	56 Pleasant Street.
White, Henry Harrison,	West Peabody,	79 Pleasant Street.
Whitmore, Philip Ferry,	Sunderland,	13 Phillips Street.
Whorf, Paul Francis,	Forest Hills,	87 Pleasant Street.
Wilkins, Alfred Emerson,	Wakefield,	83 Pleasant Street.
Willey, Harold Cleland Clancey,[1]	Orange,	101 Pleasant Street.
Williams, Donald,[1]	Catasauqua, Pa.,	C. S. C. House.
Williams, Henry Chester,[1]	Topsfield,	21 McClellan Street.
Wright, Elvin Stanley,	Worcester,	15 Fearing Street.

Unclassified Students.

Chambers, Maude Burdick,	Harpers Ferry, W. Va.,	3 Fearing Street.
Chow, Tse Ki,	Canton, China,	Care of Professor White.
Chu, Alfred Wen,	Tientsin, China,	90 Pleasant Street.
Crosby, Stanley,	Warren,	Theta Delta Chi House.
Dearth, Newman,	Ashland,	86 Pleasant Street.
Fisher, Earl Jarvis,	Falmouth,	23 Pleasant Street.
Fuller, Richard,	Salem,	6 Nutting Avenue.
Goodnow, Edna Minnie,	Amherst,	15 Spring Street.
Hart, Edward Haskell,	Falmouth,	86 Pleasant Street.
Howe, James Sullivan, Jr.,	Brookline,	Prospect House.
Kaulback, Hugh Arms,	Greenfield,	Care of Professor Gaskill.
Kennedy, Worthington Chester,	Hardwick,	15 Hallock Street.
Liang, Foo Tso,	Canton, China,	90 Pleasant Street.
Mott, Percival,	Nashua, N. H.,	81 Pleasant Street.
Moyle, John, Jr.,	Groton,	77 Pleasant Street.
Nash, Henry Clark, Jr.,	Amherst,	67 Pleasant Street.
Noble, Howard Ermy,	Tyngsborough,	"Lovers Lane."
O'Brien, Daniel William,	Wayland,	Brooks Farm.
Pease, Willard Noah M.,	Altoona, Pa.,	North Amherst.
Phelps, Benjamin Austin,	Northampton,	8 Allen Street.
Prouty, LeRoy Fletcher,	Rockland,	15 Hallock Street.
Rae, George Little,	Needham Heights,	3 Nutting Avenue.
Ray, Frederick Almar,	Hyde Park,	116 Pleasant Street.
Richards, Edwin Henry,	Hartford, Conn.,	2 Allen Street.
Selkregg, Edwin Reimund,	Amherst,	12 Cottage Street.
Stanford, Ernest Elwood,	Rowe,	71 South Pleasant Street.
Taplin, Warren Hartt,	Colorado Springs, Col.,	13 Hallock Street.
Trider, George Henry,	Waltham,	19 Pleasant Street.
Wright, George Ellery,	Brockton,	29 North Prospect Street.

---

[1] Work incomplete.

SUMMARY BY CLASSES.

Graduate students,	17
Senior class,	85
Junior class,	97
Sophomore class,	127
Freshman class,	169
Unclassified students,	29
Total,	524

GEOGRAPHICAL SUMMARY.

Massachusetts,	443
New York,	25
Connecticut,	20
New Hampshire,	6
New Jersey,	5
Pennsylvania,	4
Rhode Island,	4
Vermont,	2
Colorado,	1
Delaware,	1
Georgia,	1
Virginia,	1
West Virginia,	1
Iowa,	1
Maine,	1
China,	7
Scotland,	1
Total,	524

GRADUATE STUDENTS — CANDIDATES FOR A DEGREE.

Allen, Rodolphus Harold, B.Sc., Massachusetts Agricultural College, 1910.	Fall River.
Anderson, David Wadsworth, B.Sc., New Hampshire State College, 1910.	Manchester, N. H.
Bartlett, Oscar Christopher, B.Sc., Massachusetts Agricultural College, 1909.	Westhampton.
Bourne, Arthur Israel, A.B., Dartmouth College, 1907.	Amherst.
Crossman, Samuel Sutton, B.Sc., Massachusetts Agricultural College, 1909.	Needham.
Holland, Edward B., B.Sc., Massachusetts Agricultural College, 1892; M.Sc., Massachusetts Agricultural College, 1898.	Amherst.
Hourdequin, Leon Remy, A.B., Williams College, 1911.	Brooklyn, N. Y.
McLaine, Leonard Septimus, B.Sc., Massachusetts Agricultural College, 1910.	New York, N. Y.
Merrill, Joseph Henry, B.Sc., Dartmouth College, 1905.	Danvers.

Smulyan, Marcus Thomas, B.Sc., Massachusetts Agricultural College, 1909.	Amherst.
Thomas, Frank Lincoln, B.Sc., Massachusetts Agricultural College, 1910.	Athol.
Thompson, Edward Joseph, B.Sc., Harvard College, 1911.	Cambridge.
Watkins, John Bedford, B.Sc., Virginia Polytechnic, 1911.	Midlouthian, Va.
Regan, William Swift, B.Sc., Massachusetts Agricultural College, 1908.	Northampton.

Graduate Students — Not Candidates for a Degree.

Adams, Harold Stanard, A.B., Williams College, 1911.	Pittsfield.
Butler, Aubrey Bickford, A.B., Dartmouth College, 1911.	Chelsea.
Crocker, Bartow, B.Sc., Harvard College, 1911.	Cambridge.

ADDENDUM.

ADDENDUM.

MAJORS.

GENERAL STATEMENT.

Beginning with September, 1912, a plan of major courses will become operative for members of the junior and senior classes. A major will consist of 30 hours of correlated work, to be arranged by the student and an instructor called the adviser.

The list of courses found under each major on subsequent pages should not be considered as necessarily a rigid program to be followed. The heads of departments have suggested this series of courses as the best for the average man majoring in their department. Advisers may, however, make modifications to suit the particular needs of the student, provided these modifications conform precisely to the class schedule as published for the year.

CLASS OF 1913.

Since it will not be possible for the class of 1913 to conform fully with the regulations concerning majors given above, the following regulations will apply to them in making their elections: —

As stated below, the minimum semester credits will be 15 hours, the maximum 21 hours, and the members of the class of 1913 will fill out their elective cards with these facts in mind. For the class of 1913 the required work after the sophomore year is to be counted as follows: —

5 credits in the junior year in Military Science and Physical Education.
3 credits in Economics 1.
3 credits in English; other subjects in the Humanities, or Rural Social Science.

Each member of 1913 must obtain on June 5, from the registrar, an elective card to be filled out with his election of courses for the senior year.

Members of 1913 must from the list given below choose any instructor as his adviser. After the card has been filled out for both semesters of the senior year, and has received the approval of the adviser, it must be returned to the registrar's office on or before June 15.

RULES.

RULE 1. *Election.* — Each student, in the second semester of his sophomore year, shall elect a major subject from the list of majors given below; and this major shall consist of 30 credit hours of correlated work.

RULE 2. *Minimum Credits.* — The minimum number of credits for the junior and senior years shall be 65, inclusive of Military Drill and Physical Education.

RULE 3. *Maximum Credits.* — The maximum number of credits for any semester of the junior or senior year shall be 21.

RULE 4. *Humanities and Rural Social Science.* — A minimum of 15 credit hours in the Divisions of the Humanities and of Rural Social Science shall be required of all students during their junior and senior years, with the following restriction: that a minimum of 3 credit hours will be required in each of the divisions.

RULE 5. *Advisers.* — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student intends to elect his major. Each student should consult with the adviser as soon as possible. The adviser has full authority to prescribe the student's work up to 30 hours. It is understood, however, that so far as practicable the individual needs of the student will be recognized. It is also hoped and expected that students will be disposed to seek the counsel of the adviser with respect to the remaining courses required for graduation.

RULE 6. *Free Electives.* — Each student is required to take 30 hours in his major and 15 hours in the Divisions of the Humanities and of Rural Social Science, making a total of 45 hours. He is allowed free choice for the remaining part of his required hours, this remainder amounting to 15 hours minimum for the two years, or 35 hours maximum.

RULE 7. *Registration.* — No upper classman shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the registrar's office on June 5.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the year and will countersign the same.

(3) Each course card must be filled out, giving the name of student, with his college address, also the name of parent or guardian,

with the home address. When the elections have been entered on this card, and the balance of hours added by the student, the card must be returned to the registrar not later than June 15.

RULE 8. *Changes.* — Applications for changes may be made to the dean in writing at any time, and, when approved by him and by the committee on scholarship, become operative at the beginning of the semester following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

LIST OF MAJORS.

Agriculture.

Prof. JAMES A. FOORD, Adviser.

Course.	Credit.
Agronomy 3,	3
Agronomy 6,	3
Animal Husbandry 5,	3
Animal Husbandry 6,	1
Animal Husbandry 9,	3
Dairying 1,	3
Dairying 2,	3
Farm Administration 3,	3
Farm Administration 4,	3
Chemistry 7,	3
Veterinary Science 1,	3
	31

Agronomy.

Assistant Prof. SIDNEY B. HASKELL, Adviser.

Course.	Credit.
Agronomy 3,	3
Agronomy 4,	3
Agronomy 5,	3
Agronomy 6,	3
Agronomy 8,	3
Animal Husbandry 5,	3
Animal Husbandry 9,	3
Farm Administration 4,	3
Chemistry 7,	3
Chemistry 8,	3
	30

Animal Husbandry.

Associate Prof. J. Allan McLean, Adviser.

Course.	Credit.
Agronomy 3,	3
Animal Husbandry 5,	3
Animal Husbandry 6,	1
Animal Husbandry 8,	2
Animal Husbandry 9,	3
Animal Husbandry 10,	3
Animal Husbandry 11,	2
Dairying 1,	3
Farm Administration 3,	3
Farm Administration 4,	3
Veterinary Science 3,	3
	29

Dairying.

Associate Prof. William P. B. Lockwood, Adviser.

Course.	Credit.
Animal Husbandry 5,	3
Animal Husbandry 6,	1
Animal Husbandry 8,	2
Animal Husbandry 9,	3
Animal Husbandry 11,	2
Dairying 1,	3
Dairying 2,	3
Dairying 3,	3
Dairying 4,	3
Farm Administration 3,	3
Farm Administration 4,	3
	29

Poultry Husbandry.

Associate Prof. John C. Graham, Adviser.

Course.	Credit.
Poultry Husbandry 1,	2
Poultry Husbandry 2,	2
Poultry Husbandry 3,	1
Poultry Husbandry 4,	1-3
Poultry Husbandry 5,	1
Poultry Husbandry 6,	3
Poultry Husbandry 7,	3
Poultry Husbandry 9,	3
Pomology 1,	3
Agronomy 3,	3
Animal Husbandry 5,	3
Animal Husbandry 9,	3
Veterinary Science 1,	3
	31

General Horticulture.

Prof. Frank A. Waugh, Adviser.

This major will consist of courses selected from the Departments of Pomology, Floriculture, Market Gardening, Landscape Gardening and Forestry, to suit the particular needs of the student. In special cases, courses from the Department of Agronomy will also be counted toward the major in general horticulture.

Floriculture.

Prof. Edward A. White, Adviser.

Course.	Credit.
Floriculture 1,	4
Floriculture 2,	4
Floriculture 3,	3
Floriculture 4,	3
Horticulture 3,	3
Horticulture 4,	3
Entomology 1,	3
Market Gardening 2,	3
Botany 2,	4
	30

Note. — Horticulture 3 and 4 is a junior subject, but to balance the work for the two years it would be better for the floricultural students to take the course in the senior year.

Forestry.

Associate Prof. Frank F. Moon, Adviser.

Course.	Credit.
Forestry 1,	3
Forestry 2,	3
Forestry 3,	3
Forestry 4,	3
Forestry 5,	2
Forestry 6,	2
Entomology 5,	3
Horticulture 3,	3
Horticulture 4,	3
Botany 13,	4
	29

Landscape Gardening.

Prof. Frank A. Waugh, Adviser.

Course.	Credit.
Landscape Gardening 1,	3
Landscape Gardening 2,	3
Landscape Gardening 3,	3
Landscape Gardening 4,	3
Landscape Gardening 5,	2
Landscape Gardening 6,	2
Landscape Gardening 7,	3
Landscape Gardening 8,	3
Drawing 1,	3
Drawing 2,	3
Horticulture 3,	3
	31

Landscape Gardening 6 will probably be given quite differently in alternate years, and thus should be open to *both* juniors and seniors.

Courses for juniors *only*: Landscape Gardening, 1, 2, Drawing, 1 and 2.

Courses for seniors and graduates *only*: Landscape Gardening, 7 and 8.

Courses open to juniors and seniors, both if possible: Horticulture 3 and 4 and possibly Landscape Gardening 3 and 4.

This grouping of subjects is offered only as an example. Other groupings may be approved by the adviser, but such other groupings must be subject to the class schedule.

Pomology.

Prof. Fred C. Sears, Adviser.

Course.	Credit.
Pomology 1,	3
Pomology 2,	3
Pomology 3,	3
Pomology 4,	3
Botany 5,	2
Botany 7,	5
Agronomy 6,	3
Farm Administration 3,	3
Farm Administration 4,	3
Entomology 1,	3
	31

Agricultural Chemistry.

Assistant Prof. CHARLES A. PETERS, Adviser.

Course.	Credit.
Chemistry 5,	5
Chemistry 6,	5
Chemistry 9,	5
Chemistry 10,	5
Chemistry 11,	5
Chemistry 12, 14 or 16,	5
Chemistry 13,	3
Chemistry 15,	3
Chemistry 18,	2
	38

The major will consist of 30 credit hours selected from this list. The student will be advised concerning other subjects suited to be taken in connection with Chemistry.

Economic Entomology.

Prof. HENRY T. FERNALD, Adviser.

Course.	Credit.
Entomology 1,	3
Entomology 2,	2
Entomology 3,	4
Entomology 4,	4
Entomology 5,	3
Entomology 8,	3
Botany 3,	4
Botany 4,	2
Zoölogy 3,	3
Zoölogy 4,	3
	31

A major in Economic Entomology does not necessarily include all the entomological subjects, as implied at the top of this list.

Plant Physiology and Pathology.

Prof. GEORGE E. STONE, Adviser.

Course.	Credit.
Botany 3,.	4
Botany 4,.	2
Botany, 10,	4 or 5
Botany 14,	4
Chemistry 5,	5
Chemistry 6,	5
Entomology 1,	3
Entomology 2,	2
	29 or 30

Agricultural Education.

Prof. William R. Hart, Adviser.

Course.	Credit.
Agricultural Education 1,	3
Agricultural Education 2,	3
Agricultural Education 3,	2
Agricultural Education 4,	3
Dairying 5,	2
Farm Administration 3,	3
Floriculture 1,	4
Poultry Husbandry 1,	2
Poultry Husbandry 2,	2
Market Gardening 2, or Agronomy 3,	3
Botany 5,	2
	29

A minimum of 15 credit hours should be elected by the student from the group of subjects offered by the Divisions of the Humanities and of Rural Social Science. Not less than 3 credit hours must be taken in each division.

ELECTIVE COURSES OFFERED IN DIVISION OF HUMANITIES.				ELECTIVE COURSES OFFERED IN DIVISION OF RURAL SOCIAL SCIENCE.		
Economics and Sociology	History and Government	English	Modern Languages	Agricultural Economics	Agricultural Education	Rural Sociology
1 Elementary Economics	1 Elements of Political Science	7 Expository Writing	7 Scientific French 11 German Literature		1 Meaning of Education	3 Literature of Rural Life
3 Social Institutions and Social Problems	3 History of New England	9a. Introductory Rural Journalism (2 hrs.) 9b. Journalistic Prac. (2 hrs.) 9c. Adv. Journalistic Practice (1 hr.) (Ind.)	9 French Literature	7 Problems in Agr. Econ. (2 hrs. Ind.)	3 Methods (2 hrs. Ind.)	7 Rural Institutions
5 Public Finance, Money, Banking	5 History of Ideals	13 English Writers and Thought	1 Elementary Spanish	9 Seminar (Ind.)	5 Seminar (Ind.)	5 Social Conditions of Rural People
		15 English Language and Literature	9 Scientific German	5 Historical and Comparative Agr.		9 Social Psychology of Rural Life
		P. S. 9 Debating (Ind.) (2 hrs.)	7 Modern German			11 Soc. Aspects of Current Agric. Quest.
		17 Adv. Comp. and Literature (2 hrs.)				
			1 History of Music (Ind. evening)			13 Seminar
2 Industrial Problems	2 Local Political Institutions	8 Expository Writing (technical)	8 Scientific French		2 Vocational Educ.	4 Rural Law (Ind.)
4 Mod. Soc. Ref. Movements		10a. Reporting and News Writing (2 hrs.) 10b. Jour. Prac. (2 hrs.) 10c. Adv. Jour. Prac. (1 hr.) (Ind.)	10 French Literature	5 Co-operation in Agr. (2 hrs. Ind.)	4 Teachers' Agric.	6 Soc. Aspects of Co-op. among Farmers
6 Economic History		14 English Writers and Thought	2 Modern Spanish Authors	10 Seminar (Ind.)	6 Seminar (Ind.)	8 The State and the Farmer.
8 Anthropology		16 English Language and Literature	10 Scientific German	4 Elements of Agric. Economics		10 Farmers' Organizations
		18 Advanced Literature	8 Modern German			2 Rural Community
		P. S. 8 Occasional Oratory	2 History of Music (Ind.)			

Ind. = hours may be arranged independent of schedule.

SUMMARY.

There are four preliminary steps which a student should take in arranging for his major work.

1. Select a major.

2. Confer with major adviser for arrangement of courses, the plan to be approved by adviser in accordance with Rule 5 previously stated.

3. Select courses covering the four semesters of the junior and senior years in such a way that a minimum of 15 credits will be taken in the Divisions of Humanities and of Rural Social Science; the distribution of all but 3 of these credits may be decided by the student.

4. Choose other courses so that the total number of credits for any semester shall be not less than 16 or more than 21. (See Rules 2 and 3.)

INDEX.

PAGE

Admission 25
Advanced standing 38
Agricultural education 84
Agricultural Economics. (See Economics 1.)
Agriculture 43
Agronomy 43
Alumni associations, class secretaries, etc. 137
Animal husbandry 44
Attendance, summary of 154
Awards. (See Honors.)

Bacteriology 69
Botany 56

Certificates. (See admission.)
Chemistry 59
Civil engineering 66
Clubs, etc. 124
College officers 10–16
Committees of faculty 20
Corporation 10
Courses of instruction:
  Undergraduate 40–91
  Graduate 95–102

Dairying 46
Degrees conferred 143
Dormitories 121
Drawing 55

Economics 71, 82
English 74
Entomology 64, 98, 100
Entrance. (See Admission.)
Equipment of departments . . . 127
Examinations, entrance. (See Admission.)
Expenses 121
Experiment station 9, 17
Extension work 103

Faculty and faculty committees . 12, 20
Farm administration 47
Floriculture 51
Forestry 52
French 79

General departments 88
General information 121
Geology. (See Zoölogy.)
German 78
Government. (See History.)
Graduate school 95

PAGE

History 72
Honors 137
Horticulture 50, 101
Humanities 71
Hygiene 90

Journalism 75

Landscape gardening 53
Languages, modern European. (See English, French, German, Spanish.)
Library 132
Literature. (See English, French, German, Spanish, Rural Social Science.)

Majors, Addendum 159–168
Market gardening 54
Massachusetts Agricultural College . 7
Massachusetts Agricultural Experiment Station 9
Mathematics 66
Military science 89
Music 81

Organizations, student 124

Physical education 90
Physics 68
Political science. (See History.)
Pomology 54
Poultry husbandry 48
Prizes 126
Public speaking 77

Roll of students 145
Rural social science 82

Science, division of 56
Short courses. (See Extension Work.)
Sociology 71, 85
Spanish 81
Student expenses 121
Students, roll of 145
Summer school 108

Trustees, etc. 10

Unclassified students 39
Undergraduate courses 40-91

Veterinary science 69

Winter school 106

Zoölogy 69, 101

378.744
MaH1

THE M. A. C. BULLETIN

AMHERST, MASS.

Vol. V. No. 1. For January, 1913

Published Six Times a Year by the College.
Jan., Feb., Mar., May, Sept., Oct.

Entered as Second-class Mail Matter at the Post Office, Amherst, Mass.

Public Document No. 31

CATALOGUE

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE,

1912-1913.

FIFTIETH ANNUAL REPORT.

PART II.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1913.

Without excluding other scientific and classical studies, and including military tactics to teach such branches of learning as are related to agriculture and the mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. — *Act of Congress, July 2, 1862.*

MASSACHUSETTS AGRICULTURAL COLLEGE,

AMHERST.

CATALOGUE, 1912-1913.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1913.

Approved by
The State Board of Publication.

THE MASSACHUSETTS AGRICULTURAL COLLEGE.

This issue of the catalogue represents the status of the college for the current college year, with provisional announcement of courses of study and other matters for the year to follow.

The college reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue. Special publication will be made should it become necessary on account of important changes.

CALENDAR.

1913-14.

REGULAR COURSES.

1913.

January 6, Monday, 1.10 P.M.,	Winter recess ends; chapel.
January 24, Friday,	Semester examinations begin.
February 3, Monday, 1.10 P.M.,	Second semester begins; chapel.
March 28, Friday, 6 P.M.,	Spring recess begins.
April 7, Monday, 1.10 P.M.,	Spring recess ends.
May 30, Friday,	Holiday, Memorial Day.
May 31, Saturday,	Senior examinations begin.
June 7, Saturday,	Non-senior examinations begin.
June 14–18, Saturday–Wednesday,	Commencement.
June 19–21, Thursday–Saturday,	Entrance examinations.
September 3–6, Wednesday–Saturday,	Entrance examinations.
September 10, Wednesday, 1.30 P.M.,	First semester begins; chapel.
October 13, Monday forenoon,	Half holiday, observance of Columbus Day.
November 26–December 1, Wednesday, 1 P.M.–Monday, 1.10 P.M., chapel,	Thanksgiving recess.
December 19, Friday, 6 P.M.,	Winter recess begins.

1914.

January 5, Monday, 1.10 P.M.,	Winter recess ends; chapel.
January 23, Friday,	Semester examinations begin.
February 2, Monday, 1.10 P.M.,	Second semester begins; chapel.
February 23, Monday forenoon,	Half holiday, observance of Washington's Birthday.
March 27, Friday, 6 P.M.,	Spring recess begins.
April 6, Monday, 1.10 P.M.,	Spring recess ends.
April 20, Monday forenoon,	Half holiday, observance of Patriots' Day.
June 1, Monday,	Senior examinations begin.
June 6, Saturday,	Non-senior examinations begin.
June 13–June 17, Saturday–Wednesday,	Commencement.
June 18–20, Thursday–Saturday,	Entrance examinations.

MASSACHUSETTS AGRICULTURAL COLLEGE.

HISTORY. — The Massachusetts Agricultural College was among the first of those organized under the national land grant act of 1862. This act granted public lands to the several States and Territories, the funds realized from the sale of which should be used to establish colleges of agriculture and mechanics arts; the bill was framed by the late Senator Justin Smith Morrill of Vermont. The Legislature of Massachusetts has granted money for the erection of nearly all the buildings now on the grounds, and makes annual appropriations for the maintenance of the college.

The college was incorporated in 1863, and on the 2d of October, 1867, was formally opened to its first class of students. At that time four buildings had been erected, and there were four regular instructors employed by the institution. In 1882 the State located its agricultural experiment station on the grounds of the college. Later, after the federal law was passed granting financial aid to experiment stations, the Massachusetts Agricultural Experiment Station was consolidated with the federal station, and subsequently the whole was incorporated with the college.

COURSES. — The college offers an education without tuition fee to any student who is a resident of Massachusetts and who meets the requirements for admission. Women are admitted on the same basis as are men. Students who are not residents of Massachusetts are required to pay a nominal tuition fee. The four-years[1] course leads to the degree of bachelor of science, and the graduate school offers advanced courses leading to the degrees of master of science and doctor of philosophy. The winter school of ten weeks, for admission to which no scholastic requirements are made, is held each winter, beginning early in January. There are other short courses at the college, such as the beekeepers' course and summer school. Various forms of extension teaching are carried on away from the college, such as correspondence courses, traveling schools, educational exhibits, lecture courses, demonstrations, etc.

PURPOSE OF THE COLLEGE. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement the term "agricultural vocations" is used in its broadest sense. Courses are offered which give efficient training in various agricultural pursuits, such as general farming, dairying, management of estates, poultry husbandry, fruit growing, market gardening, landscape gardening and forestry. Students are also fitted for positions in institutions designed for investigation in many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, for scientific experts in chemistry, entomology and botany, and for business operations having connection with practical agriculture.

---

[1] Twenty-six teaching departments offer instruction in agriculture, horticulture, sciences, the humanities and rural social science. A system of major courses has recently been adopted which permits a student to elect work in 1 of 14 departments and to specialize in that and allied subjects for a period of two years.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences, particularly chemistry, botany and zoölogy, are an essential preparation. Still other students find the course a desirable education, without regard to future occupation. The course of study is designed to give a student a general college education, and in addition to make it possible for him to specialize in any department in which major courses are offered.

Location and Equipment. — The agricultural college is located in the town of Amherst. The grounds comprise more than 500 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is about 98 miles from Boston, and may be reached over the Central Massachusetts division of the Boston & Maine Railroad, or by way of the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

THE MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was then without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college. It was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about one-third of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to the committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, experimentation and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

THE CORPORATION.

MEMBERS OF THE CORPORATION.

	TERM EXPIRES
WILLIAM H. BOWKER of Concord,	1913
GEORGE H. ELLIS of West Newton,	1913
CHARLES E. WARD of Buckland,	1914
ELMER D. HOWE of Marlborough,	1914
NATHANIEL I. BOWDITCH of Framingham,	1915
WILLIAM WHEELER of Concord,	1915
ARTHUR G. POLLARD of Lowell,	1916
CHARLES A. GLEASON of New Braintree,	1916
FRANK GERRETT of Greenfield,	1917
HAROLD L. FROST of Arlington,	1917
CHARLES H. PRESTON of Danvers,	1918
FRANK A. HOSMER of Amherst,	1918
DAVIS R. DEWEY of Cambridge,	1919
M. FAYETTE DICKINSON of Brookline,	1919

MEMBERS EX OFFICIO.

His Excellency Governor EUGENE N. FOSS, *President of the Corporation.*
KENYON L. BUTTERFIELD, *President of the College.*
DAVID SNEDDEN, *State Commissioner of Education.*
J. LEWIS ELLSWORTH, *Secretary of the State Board of Agriculture.*

OFFICERS OF THE CORPORATION.

His Excellency Governor EUGENE N. FOSS of Boston, *President.*
CHARLES A. GLEASON of New Braintree, *Vice-President.*
J. LEWIS ELLSWORTH of Worcester, *Secretary.*
FRED C. KENNEY of Amherst, *Treasurer.*
CHARLES A. GLEASON of New Braintree, *Auditor.*

STANDING COMMITTEES OF THE CORPORATION.[1]

Committee on Finance.

CHARLES A. GLEASON, *Chairman.*
GEORGE H. ELLIS.
NATHANIEL I. BOWDITCH.
ARTHUR G. POLLARD.
CHARLES E. WARD.
FRANK A. HOSMER.

Committee on Course of Study and Faculty.

WILLIAM WHEELER, *Chairman.*
WILLIAM H. BOWKER.
M. FAYETTE DICKINSON.
DAVID SNEDDEN.
ELMER D. HOWE.
DAVIS R. DEWEY.
FRANK A. HOSMER.

---

[1] The president of the college is *ex officio* member and secretary of standing committees.

Committee on Farm.

Nathaniel I. Bowditch, *Chairman.*
Frank Gerrett.
Charles A. Gleason.
George H. Ellis.

Committee on Horticulture.

J. Lewis Ellsworth, *Chairman.*
Davis R. Dewey.
Elmer D. Howe.
Harold L. Frost.

Committee on Experiment Department.[1]

Charles H. Preston, *Chairman.*
J. Lewis Ellsworth.
Arthur G. Pollard.
Charles E. Ward.
Harold L. Frost.

Committee on Buildings and Arrangement of Grounds.

William H. Bowker, *Chairman.*
William Wheeler.
Frank Gerrett.
M. Fayette Dickinson.
Charles H. Preston.

Examining Committee of Overseers from the State Board of Agriculture.

John Bursley of West Barnstable.
Frank P. Newkirk of Easthampton.
William E. Patrick of Warren.
John J. Erwin of Wayland.
R. Henry Race of North Egremont.

---

[1] The director of the experiment station is a member of the committee on experiment department, without vote.

Officers of the Institution.

[The names of the faculty are arranged in groups according to rank. Within these groups, the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held.]

THE FACULTY.

Kenyon L. Butterfield, A.M., LL.D., ... President's House.
President of the College, and Head of Division of Rural Social Science.
George F. Mills, A.M., ... 46 Amity Street.
Dean of the College and Professor of Languages and Literature.
Charles H. Fernald, Ph.D., ... 3 Hallock Street.
Honorary Director of the Graduate School.
William P. Brooks,[1] Ph.D., ... — —
Director of the Experiment Station and Lecturer on Soil Fertility.
William D. Hurd, M.Agr., ... 82 Pleasant Street.
Director of the Extension Service.
Charles E. Marshall, Ph.D., ... Sunset Avenue.
Director of Graduate School and Professor of Microbiology.
Frank A. Waugh, M.Sc., ... Massachusetts Agricultural College.
Head of Division of Horticulture and Professor of Landscape Gardening.
James A. Foord, M.Sc., ... 56 Lincoln Avenue.
Head of Division of Agriculture and Professor of Farm Administration.
Robert J. Sprague, Ph.D., ... Mount Pleasant.
Head of Division of the Humanities and Professor of Economics and Sociology.
Joseph B. Lindsey, Ph.D., ... 47 Lincoln Avenue.
Goessmann Professor of Chemistry.
Charles Wellington, Ph.D., ... 14 Maple Avenue.
Professor of Chemistry.
James B. Paige, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Professor of Veterinary Science, Chairman of Division of Science.
George E. Stone, Ph.D., ... Mount Pleasant.
Professor of Botany.
Philip B. Hasbrouck, B.Sc., ... 130 Pleasant Street.
Professor of Physics and Registrar of the College.
John E. Ostrander, A.M., C.E., ... 44 North Prospect Street.
Professor of Mathematics and Civil Engineering.
Henry T. Fernald, Ph.D., ... 44 Amity Street.
Professor of Entomology.
George C. Martin, C.E., Captain 18th U. S. Infantry, 35 North Prospect Street.
Professor of Military Science and Tactics.
Edward A. White, B.S., ... Mount Pleasant.
Professor of Floriculture.
William R. Hart, A.M., ... 97 Pleasant Street.
Professor of Agricultural Education.
Fred C. Sears, M.Sc., ... Mount Pleasant.
Professor of Pomology.
Fred C. Kenney, ... Mount Pleasant.
Treasurer of the College.

---

[1] On leave of absence.

Edward M. Lewis, A.M., ... 34 Amity Street.
Associate Dean and Professor of Literature.

William D. Clark, M.F., ... 25 North Prospect Street.
Professor of Forestry.

Sidney B. Haskell, B.Sc., ... 5 Fearing Street.
Associate Professor of Agronomy.

Robert W. Neal, A.M., ... 7 Woodside Avenue.
Associate Professor of English.

Clarence E. Gordon, Ph.D., ... Nutting Avenue.
Associate Professor of Zoölogy and Geology.

Alexander E. Cance, Ph.D., ... 9 Fearing Street.
Associate Professor of Agricultural Economics.

Joseph S. Chamberlain, Ph.D., ... Mount Pleasant.
Associate Professor of Organic and Agricultural Chemistry.

William P. B. Lockwood, B.Sc.Agr., ... 5 East Pleasant Street.
Associate Professor of Dairying.

Elmer K. Eyerly, A.M., ... 50 Amity Street.
Associate Professor of Rural Sociology.

John A. McLean, A.B., B.Sc.Agr., ... Lincoln Block.
Associate Professor of Animal Husbandry.

John C. Graham, B.Sc.Agr., ... North Amherst.
Associate Professor of Poultry Husbandry.

Guy C. Crampton, Ph.D., ... 86 Pleasant Street.
Associate Professor of Entomology.

Charles A. Peters, Ph.D., ... Sunset Avenue.
Associate Professor of Inorganic and Soil Chemistry.

A. Vincent Osmun, M.Sc., ... North Amherst.
Assistant Professor of Botany.

Edgar L. Ashley, A.M., ... Prospect House.
Assistant Professor of German.

Anderson A. Mackimmie, A.B., ... Nutting Avenue.
Assistant Professor of French.

Burton N. Gates, Ph.D., ... 42 Lincoln Avenue.
Assistant Professor of Beekeeping.

Curry S. Hicks, B.Sc., ... 8 Allen Street.
Assistant Professor of Physical Education and Hygiene.

Frederick L. Yeaw, B.Sc., ... 17 Fearing Street.
Assistant Professor of Market Gardening.

George S. Gage, Ph.D., ... 27 Sunset Avenue.
Assistant Professor of Animal Pathology.

Ernest Anderson, Ph.D., ... 5 Nutting Avenue.
Assistant Professor of General and Physical Chemistry.

Henry E. Smith, M.A., ... Nutting Avenue.
Assistant Professor of English.

George N. Holcomb, A.B., S.T.B., ... South Pleasant Street.
Lecturer in History.

Frank W. Rane, M.F., ... Boston.
Lecturer in Forestry.

Charles R. Green, B.Agr., ... Mount Pleasant.
Librarian.

C. Robert Duncan, B.Sc., ... 31 North Prospect Street.
Instructor in Mathematics.

Arthur K. Harrison, ... 8 Allen Street.
Instructor in Landscape Gardening.

Chester A. Butman, B.Sc., ... 15 Spring Street.
Instructor in Physics.

Willard A. Wattles, A.M., ... Mount Pleasant.
Instructor in English.

William L. Harmount, A.B., ... 86 Pleasant Street.
Instructor in French.

Elvin L. Quaife, B.Sc.Agr., ... 9 Fearing Street.
Instructor in Animal Husbandry.

William L. Machmer, A.M., Kendrick Place.
Instructor in Mathematics.
Arthur N. Julian, B.A., 50 Pleasant Street.
Instructor in German.
Walter W. Chenoweth, M.Sc., North Amherst.
Instructor in Pomology.
Walter E. Prince, B.A., 13 Spring Street.
Instructor in English and Public Speaking.
Abbott A. Brown, B.Sc.Agr., North Amherst.
Instructor in Poultry Husbandry.
Elmer M. McDonald, B.Sc., 15 Fearing Street.
Instructor in Agronomy.
Samuel Coons, 56 Pleasant Street.
Buttermaker.
Helena T. Goessmann, Ph.M., 44 Amity Street.
Assistant in English.
Samuel R. Parsons, B.Sc., 77 Pleasant Street.
Assistant in Mathematics and in Military Science.
Frederick A. McLaughlin, B.Sc., Clark Hall.
Assistant in Botany.
William J. Fitzmaurice, – –
Assistant in Physical Education.
Robert H. Bogue, B.Sc., 17 Phillips Street.
Assistant in Chemistry.

Graduate Assistants.

Irving W. Davis, B.Sc., 96 Pleasant Street.
Assistant in Beekeeping.
G. Scott Fowler, B.Sc., 15 Phillips Street.
Assistant in Chemistry.
Rupert G. Gates, B.Sc., 120 Pleasant Street.
Assistant in Chemistry.
James F. Martin, B.Sc., 19 South East Street.
Assistant in Entomology.
Harry A. Noyes, B.Sc., Chemistry Laboratory.
Assistant in Chemistry.
Ralph R. Parker, B.Sc., 13 Fearing Street.
Assistant in Zoölogy and Geology.
Raymond G. Smith, B.Sc., 5½ East Pleasant Street.
Assistant in Botany.

Other College Officers.

Edwin H. Forristall, M.Sc., Massachusetts Agricultural College.
Farm Superintendent.
Ralph J. Watts, B.Sc., Nutting Avenue.
Secretary to the President.
Harold A. Crane, 1 Woodside Avenue.
Cashier.
Newton Wallace, 6 Phillips Street.
Electrician.
Percy C. Schroyer, 120 Pleasant Street.
Assistant Engineer.
Clarence A. Jewett, 112 Pleasant Street.
Superintendent of Buildings.
James Whiting, Hallock Street.
Foreman, Department of Floriculture.
William Chesley, Draper Hall.
Steward, Dining Hall.
John J. Lee, Sergeant, 9 Phillips Street.
Assistant to the Military Detail.
Miss Mary E. Caldwell, Draper Hall.
Bookkeeper.

Miss Henrietta Webster, Clerk, Treasurer's Office.	Draper Hall.
Miss Dorothy Mudge, Clerk, Treasurer's Office.	Gaylord Street.
Miss Stella H. Webb, Correspondence Clerk, President's Office.	9 Phillips Street.
Miss Lillian M. Gelinas, Clerk, President's Office.	East Pleasant Street.
Miss Alice Gilbert, Stenographer, Division of Agriculture.	Gaylord Street.
Miss Luliona N. Barker, Stenographer, Division of Agriculture.	9 Phillips Street.
Miss Georgia A. King, Clerk, Registrar's Office.	9 Phillips Street.
Miss Helen V. Gaskill, Stenographer, Division of Floriculture.	105 Main Street.
Miss Lina Fisher, Stenographer, Department of Chemistry.	28 Pleasant Street.
Miss Gladys E. Russell, Stenographer, Division of Horticulture.	Draper Hall.
Miss Virginia Noble, Clerk, Dean's Office.	Draper Hall.
Miss Lorian P. Jefferson, Expert Secretary, Division of Rural Social Science.	Kendrick Place.

THE EXTENSION SERVICE STAFF.

William D. Hurd, M.Agr., Director.	82 Pleasant Street.
Earnest D. Waid, B.Agr., Assistant Director.	Amity Street.
Orion A. Morton, Extension Professor of Agricultural Education.	Mount Pleasant.
Ezra L. Morgan, M.A., Community Field Agent.	Amity Street.
George F. E. Story, B.Sc.Agr., Extension Instructor in Dairying and Animal Husbandry.	10 Allen Street.
Ralph W. Rees, B.Sc., Extension Instructor in Pomology.	17 Fearing Street.
Charles H. White, B.Sc., Field Agent, Worcester County.	North Uxbridge.
Herbert J. Baker, B.Sc., Field Agent in Farm Management.	– –
Arthur T. Dailey, B.Sc., Supervisor of Correspondence Courses.	9 Fearing Street.
Albert W. Doolittle, Field Agent, Barnstable County.	Sandwich.
Miss Mabel R. Case, Clerk to the Director.	Draper Hall.
Miss Hannah Griffin, Clerk.	Draper Hall.

THE EXPERIMENT STATION STAFF.

William P. Brooks,[1] Ph.D., Director.	– –
Fred W. Morse, Ph.D., Acting Director.	40 Pleasant Street.
Joseph B. Lindsey, Ph.D., Vice-Director.	47 Lincoln Avenue.
Fred C. Kenney, Treasurer.	Mount Pleasant.
Charles R. Green, B.Agr., Librarian.	Mount Pleasant.

---

[1] On leave of absence.

Department of Plant and Animal Chemistry.

Joseph B. Lindsey, Ph.D., ... 47 Lincoln Avenue.
Chemist.
Edward B. Holland, M.Sc., ... 28 North Prospect Street.
Associate Chemist, in charge of Research Division.
Fred W. Morse, Ph.D., ... 40 Pleasant Street.
Research Chemist.
Henri D. Haskins, B.Sc., ... Amherst House.
In charge of Fertilizer Division.
Philip H. Smith, M.Sc., ... 102 Main Street.
In charge of Feed and Dairy Division.
Lewell S. Walker, B.Sc., ... 19 Phillips Street.
Assistant.
James C. Reed, B.Sc., ... Nutting Avenue.
Assistant.
Rudolph W. Ruprecht, B.Sc., ... 31 Amity Street.
Assistant.
George R. Pierce, B.Sc., ... 53 Lincoln Avenue.
Assistant.
Carleton P. Jones, B.Sc., ... 30 North Prospect Street.
Assistant.
Joseph T. Howard, ... North Amherst.
Collector.
Harry L. Allen, ... 89 Main Street.
Assistant.
James R. Alcock, ... Massachusetts Agricultural College.
Assistant in Animal Nutrition.
Carlos L. Beals, B.Sc., ... North Amherst.
Assistant.

Department of Agriculture.

William P. Brooks,[1] Ph.D., ... – –
Agriculturist.
Henry J. Franklin, Ph.D., ... East Wareham.
In charge of Cranberry Investigation.
Edwin F. Gaskill, B.Sc., ... North Amherst.
Assistant Agriculturist.

Department of Horticulture.

Frank A. Waugh, M.Sc., ... Massachusetts Agricultural College.
Horticulturist.
Fred C. Sears, M.Sc., ... Mount Pleasant.
Pomologist.
Jacob K. Shaw, Ph.D., ... 1 Allen Street.
Assistant Horticulturist.

Department of Botany and Vegetable Pathology.

George E. Stone, Ph.D., ... Mount Pleasant.
Botanist and Vegetable Pathologist.
George H. Chapman, M.Sc., ... 13 Fearing Street.
Assistant Botanist.
Edward A. Larrabee, B.Sc., ... Clark Hall.
Assistant Botanist.

Department of Entomology.

Henry T. Fernald, Ph.D., ... 44 Amity Street.
Entomologist.
Burton N. Gates, Ph.D., ... 42 Lincoln Avenue.
Apiarist.
Arthur I. Bourne, B.A., ... 12 East Pleasant Street.
Assistant in Entomology.

---

[1] On leave of absence.

DEPARTMENT OF VETERINARY SCIENCE.

JAMES B. PAIGE, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Veterinarian.

DEPARTMENT OF METEOROLOGY.

JOHN E. OSTRANDER, A.M., C.E., ... 35 North Prospect Street.
Meteorologist.

HARRIS W. ANGIER, ... Massachusetts Agricultural College.
Observer.

OTHER OFFICERS OF THE EXPERIMENT STATION.

BENJAMIN G. SOUTHWICK, B.Sc., . . . Massachusetts Agricultural College.
Secretary to the Director.

Mrs. LUCIA G. CHURCH, ... 4 Hallock Street.
Stenographer, Director's Office.

Miss F. ETHEL FELTON, ... 9 Phillips Street.
Stenographer, Department of Plant and Animal Chemistry.

Miss BRIDIE O'DONNELL, ... Hadley.
Stenographer, Department of Entomology.

Miss ALICE M. HOWARD, ... North Amherst.
Stenographer, Department of Plant and Animal Chemistry.

Miss JESSIE V. CROCKER, ... Sunderland.
Stenographer, Department of Botany.

Miss GRACE E. GALLOND, ... 28 Pleasant Street.
Stenographer, Director's Office.

Miss MARY R. KINGSBURY, ... 97 Pleasant Street.
Stenographer, Department of Poultry Husbandry.

STANDING COMMITTEES OF THE FACULTY.[1]

1912-13.

CATALOGUE AND OTHER PUBLICATIONS.

Associate Professor NEAL.
Associate Professor EYERLY.
Associate Professor CANCE.

COMMENCEMENT.

Professor PAIGE.
Captain MARTIN.
Professor WHITE.
Mr. KENNEY.
Mr. DUNCAN.
Mr. PHILIP H. SMITH.[2]

COURSE OF STUDY.

Professor HART.
Professor WAUGH.
Professor FOORD.
Professor OSTRANDER.
Professor SPRAGUE.
Associate Professor CHAMBERLAIN.

DISCIPLINE (ADVISORY).

Professor MILLS.
Professor HASBROUCK.
Captain MARTIN.
Professor LEWIS.
Associate Professor GORDON.
Assistant Professor MACKIMMIE.

EMPLOYMENT.

Professor SEARS.
Mr. KENNEY.
Associate Professor HASKELL.

ENTRANCE EXAMINATIONS AND ADMISSION.

Professor HASBROUCK.
Associate Professor GRAHAM.
Assistant Professor OSMUN.
Assistant Professor ASHLEY.
Mr. MACHMER.
Mr. WATTLES.

---

[1] The president of the college is ex officio member of each standing committee.

[2] Not a member of the faculty.

GRADUATE SCHOOL.

Director MARSHALL.
- Professor LINDSEY.
- Professor PAIGE.
- Professor STONE.
- Professor FERNALD.
- Professor SEARS.
- Associate Professor GORDON.

LIBRARY.

Professor STONE.
- Professor WELLINGTON.
- Professor MARSHALL.
- Associate Professor CANCE.

PHYSICAL EDUCATION AND ATHLETICS.

Assistant Professor HICKS.
- Director HURD.
- Professor LEWIS.
- Assistant Professor YEAW.

SCHEDULE.

Associate Professor LOCKWOOD.
- Associate Professor NEAL.
- Associate Professor PETERS.

SCHOLARSHIP.

Associate Professor GORDON.
- Professor MILLS.
- Professor HASBROUCK.
- Professor LEWIS.
- Assistant Professor MACKIMMIE.

STUDENT LIFE.

Director HURD.
- Professor LEWIS.
- Associate Professor CHAMBERLAIN.
- Associate Professor McLEAN.
- Associate Professor HASKELL.
- Assistant Professor MACKIMMIE.
- Assistant Professor HICKS.

UNCLASSIFIED STUDENTS.

Professor WHITE.
- Associate Professor LOCKWOOD.
- Associate Professor PETERS.

THE COLLEGE.

ADMISSION.

A. APPLICATION FOR ADMISSION.

Correspondence about admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege on or before June 1 of the year in which examination is desired. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. MODES OF ADMISSION.

Students are admitted to the freshman class either upon *certificate* or upon *examination*. No *diploma* from a secondary school will be considered.

CERTIFICATES. — The entrance requirements may be met by certification in any of the following ways: —

1. By presenting certificate from a school approved for such privilege by this college.
2. By presenting certificate from any school approved by the college entrance examination boards.
3. By presenting the customary credentials from the Board of Regents of the State of New York for any of the subjects of the entrance requirements.

Certificates must present not less than seven of the necessary fourteen credits in all. Those subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.[1]

---

[1] *Entrance with Condition in English.* — Under the rule permitting entrance conditions of not more than two units of the preparatory subjects applicants may be admitted, upon examination, with a condition in English, provided that they show, upon examination, satisfactory preparation in work entitling them to a ranking of 60 or higher.

Students so admitted, must, to remove the condition, pass an examination covering the regular 3-units requirement.

Places of Examination. — Examinations for admission to the college are held as follows: —

In June of each year: in Amherst, in the building of the Department of Physics, Massachusetts Agricultural College; in Boston, in the College of Liberal Arts of Boston University, Boylston Street, corner of Exeter; in Worcester, in Horticultural Hall.

In September, examinations will be held in Amherst only.

Schedule for Entrance Examinations, June 19–21, inclusive, 1913. — The examinations in June will follow this schedule: —

First Day.

7.45 A.M. Registration.[1]
8 A.M. Plane geometry.
10 A.M. Chemistry.
11.30 A.M. Botany.
2 P.M. Algebra.
3.30 P.M. Physics.

Second Day.

8 A.M. Required English.
11 A.M. Solid geometry.
2 P.M. History, required and elective.

Third Day.

8 A.M. French, German, required and elective.
1 P.M. Latin A and B and all one-half electives, except those already noted.

Schedule for Entrance Examinations in September. — In September, 1913, the examinations will be given September 3–6, inclusive, and will follow the order indicated below: —

First Day.

1 P.M. Registration.
1.15–5 P.M. Greek A and B.

Second Day.

8 A.M. Plane geometry.
10 A.M. Chemistry.
11.30 A.M. Botany.
2 P.M. Algebra.
3.30 P.M. Physics.
4.30 P.M. Elective English.

Third Day.

8 A.M. Required English.
11 A.M. Solid geometry, agriculture.
2 P.M. History, required and elective.

Fourth Day.

8 A.M. French, German, required and elective.
1 P.M. Latin A and B and all one-half credit electives, except those already noted.

C. REQUIREMENTS FOR ADMISSION.

The requirements for admission are based on the completion of a four-years course in a high school or its equivalent, and are stated in terms of units. The term unit means the equivalent of four or five recitations a week for a school year. Neither more nor less credit will be given in any subject than is indicated in the table below. Fourteen units must be offered for admission, of which eight and one-half are required and five and one-half are elective.

---

[1] Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.

(*a*) The following eight and one-half units are required: —

Language.

English,	3
French or German,	2

History and Civics.

History (elective),	1
(*a*) Ancient history.	
(*b*) Medieval and modern history.	
(*c*) English history.	
(*d*) General history.	
(*e*) United States history and civics.	

Mathematics.

Algebra, through progressions,	1½
Plane geometry,	1

(*b*) In addition to the requirements under (*a*), five and one-half units must be offered from the following-named elective subjects. Not more than four of those subjects in which the credit sought is one-half unit will be accepted.

Language.

English in addition to requirements,	1
French in addition to requirements,	2 or 1[1]
German in addition to requirements,	2 or 1[1]
Greek,	2 or 3
Latin,	2 or 3

History.

In addition to requirements,	1, 2, or 3

Mathematics, and Other Sciences.

Solid geometry,	½
Trigonometry,	½
Chemistry,	1
Physiography,	½
Physiology,	½
Agriculture,[2]	½ or 1
Botany,[2]	½ or 1
Geology,[2]	½
Physics,[2]	1
Zoölogy,[2]	½
Commercial geography,[3]	½
Drawing,[3]	½
Manual training,[3]	½ or 1

---

[1] If but one elective unit be offered, it must be in the same language as that offered to meet the two-year language requirement.

[2] Note-book required as part of preparation will be credited as part of the examination.

[3] Certification necessary in these subjects; no examinations given.

PRESENTATION OF NOTE-BOOKS. — The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 2, page 25).

Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificate should not present note-books; but their certificate must state that note-books have been satisfactorily completed.

D. STATEMENT OF PREPARATION REQUIRED FOR ADMISSION.

In some cases the requirements of the College Entrance Examination Board are here mentioned. A pamphlet containing detailed explanation of these requirements can be had of the Board for 10 cents. Address substation 84, New York City.

AGRICULTURE.[1] — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade. The examination in agriculture will be given in September only.

BOTANY. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Steven's "Introduction to Botany" and Bergen and Davis's "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit; and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

CHEMISTRY. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements, some of the experiments being quantitative. The keeping of a note-book is required.

MATHEMATICS. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations;

---

[1] Examination given in September only.

the binomial theorem for positive integral exponents, the formulas for the *n*th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work should consist of both class-room work and laboratory practice. The work covered in the class room should be equal to that outlined in Hall & Bergen's "Text-book of Physics;" the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOLOGY. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body: Briefer Course."

ZOÖLOGY, PHYSIOGRAPHY, GEOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis's "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present note-books, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

HISTORY. — The required unit must be offered in either ancient history, medieval and modern history, English history, general history, or United

States history and civics. Either one, two or three elective units in any of the historical subjects here named may be offered, provided that such units may not be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on an outline map.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers, in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

ENGLISH. — For 1913, 1914: —

English Grammar and Composition. — Command of correct and clear English (spoken or written) requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, paragraphs, and the different kinds of whole composition, including letter writing, should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise narration, description and easy exposition and argument based upon simple outlines. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

Literature. — Ability to read with accuracy, intelligence and appreciation is sought through study of books included in two lists, headed respectively "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud, and encouraged to commit to memory some of the more notable passages, both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads, and with their place in literary history.

(*a*) Reading: The aim of this course is to foster in the student the habit of intelligent reading, and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from which at least ten units (each unit being set off by semicolons) are to be selected, two from each group: —

I. The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission if desired, of books XI., XIII., XIV., XV., XVII., XXI.; Virgil's "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any unit of this group a unit from any other group may be substituted.

II. Shakspere's "Merchant of Venice;" "Midsummer Night's Dream;" "As You Like It;" "Twelfth Night;" "Henry the Fifth;" "Julius Cæsar."

III. Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" either Scott's "Ivanhoe" or "Quentin Durward;" Hawthorne's "House of the Seven Gables;" either Dickens's "David Copperfield" or "A Tale of Two Cities;" Thackeray's "Henry Esmond;" Mrs. Gaskell's "Cranford;" George Eliot's "Silas Marner;" Stevenson's "Treasure Island."

IV. Bunyan's "Pilgrim's Progress," Part I.; "The Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography" (condensed); Irving's "Sketch Book," Macaulay's "Essays on Lord Clive" and "Warren Hastings;" Thackeray's "English Humourists;" selections from Lincoln, including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address and the letter to Horace Greeley, along with a brief memoir or estimate; Parkman's "Oregon Trail;" either Thoreau's "Walden," or Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge;" "A Liberal Education" and "A Piece of Chalk;" Stevenson's "Inland Voyage" and "Travels with a Donkey."

V. Palgrave's "Golden Treasury" (first series), books II. and III., with especial attention to Dryden, Collins, Gray, Cowper and Burns; Gray's "Elegy in a Country Churchyard" and Goldsmith's "Deserted Village;" Coleridge's "Ancient Mariner" and Lowell's "Vision of Sir Launfal;" Scott's "Lady of the Lake;" Byron's "Childe Harold," Canto IV., and "Prisoner of Chillon;" Palgrave's "Golden Treasury" (first series), book IV., with especial attention to Wordsworth, Keats and Shelley; Poe's "Raven," Longfellow's "Courtship of Miles Standish," and Whittier's "Snow Bound;" Macaulay's "Lays of Ancient Rome" and Arnold's "Sohrab and Rustum;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Hervé Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City."

(*b*) Study: This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. For this close reading are provided a play, a group of poems, an oration and an essay, as follows: —

Shakspere's "Macbeth;" Milton's "L'Allegro," "Il Penseroso" and "Comus;" either Burke's "Speech on Conciliation with America," or both Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" either Macaulay's "Life of Johnson," or Carlyle's "Essay on Burns."

Examination. — However accurate in subject-matter, no paper will be deemed satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which may be taken as a preliminary, and the other as a final.

The first part of the examination will be based upon ten units chosen, in accordance with the plan described earlier, from the lists headed reading; and it may include also questions upon grammar and the simpler principles of rhetoric, and short compositions upon topics drawn from the student's general knowledge or experience. On the books prescribed for reading, the form of the examination will usually be the writing of short paragraphs on several topics which the candidate may choose out of a considerable number. These topics will involve such knowledge and appreciation of plot, character-development and other qualities of style and treatment as may be fairly expected of boys and girls. In grammar and rhetoric, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors.

The second part of the examination will include composition and these books comprised in the list headed study. The test in composition will consist of one essay or more, developing a theme through several paragraphs; the subjects will be drawn from the books prescribed for study, from the candidate's other studies and from his personal knowledge and experiences quite apart from reading. For this purpose the examiner will provide several subjects from which the candidate may make his own selections. The test on the books prescribed for study will consist of questions upon their content, form and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their other works, and the periods of literary history to which they belong.

ENGLISH, ELECTIVE.[1] — To secure a fourth entrance credit in English, the applicant should do (*a*) the full equivalent of three years' work (required English), and also (*b*) the full equivalent of a fourth year's work. Applicants not certified with a fourth entrance credit will be examined, provided that the applicant, on or before June 1, notify the Department of English of his intention to take the examination, and supply thereafter the information needed by the department to prepare the examination questions. The information blanks will be forwarded by the Department of English upon receipt of the notice.

---

[1] Examination given in September only.

Subjects accepted. — The applicant may offer (*a*) any one of the subjects stated hereunder, or (*b*) any two of these subjects in combination.

(*a*) History of American literature.
(*b*) History of English literature (or lives of the great authors).
(*c*) Classics *other than those read to meet the three-credit requirement.*
(*d*) Advanced composition.
(*e*) History of the English language.
(*f*) Advanced high school grammar.

Advanced Standing in College. — Whether advanced standing shall be given applicants entering with a fourth credit in English will be determined by consideration of each case individually. Much weight is given to the ability of the student to express himself correctly and clearly, to think clearly, and to grasp the meaning of printed language. A special examination will be given in the opening week of college, notice of which will be posted on the English bulletin board, for freshmen who wish to apply for advanced standing.

Presentation of Note-books and Themes. — Applicants for examination, either for fourth-unit credit or for advanced standing, are advised to present the note-books, themes, etc., prepared by them in the preparatory school, as an aid toward determining their proficiency.

For 1915–19 inclusive: —

The requirements for entrance to the Massachusetts Agricultural College continue to be those of the National Conference on Uniform Entrance Requirements in English (for detailed statement governing 1915–19, apply to the College Entrance Examination Board).

Attention is called to two recommendations of the National Conference made in the official statement of requirements for 1915–19; namely: —

1. That colleges so desiring may set an examination requiring no prescribed books, but testing the same general kind of preparation as that indicated in the standard requirements.

2. That individual colleges take such steps as may be found necessary to ascertain whether candidates for entrance possess an adequate equipment in oral English.

These recommendations agree with the policy of the agricultural college, which will, as rapidly as seems expedient, proceed in accordance with them. Schools wishing to present candidates prepared in accordance with the intent of these recommendations will have the co-operation of the college. The college understands this intent to be the development of the pupil's powers of thought, understanding and expression; the test to be not merely a test of memory, but even more a test of ability, to be shown by dealing with new problems calling for the application of his previously gained knowledge and skill.

The list of books prescribed for 1915–19 here follows: —

(A) *Reading*: With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except as otherwise provided under Group I: —

Group I. Classics in Translation. — The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther;

the "Odyssey," with the omission, if desired, of books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of books XI., XIII., XIV., XV., XVII., XXI.; the "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellency.

For any selection from this group a selection from any other group may be substituted.

Group II. Shakspere. — "Midsummer Night's Dream;" "Merchant of Venice;" "As You Like It;" "Twelfth Night;" "The Tempest;" "Romeo and Juliet;" "King John;" "Richard II.;" "Richard III.;" "Henry V.;" "Coriolanus;" "Julius Cæsar;"[1] "Macbeth;"[1] "Hamlet."[1]

Group III. Prose Fiction. — Malory's "Morte d'Arthur" (about 100 pages); Bunyan's "Pilgrim's Progress," Part I.; Swift's "Gulliver's Travels" (voyages to Lilliput and to Brobdingnag); Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" Frances Burney's "Evelina;" Scott's novels, any *one*, "Guy Mannering," "Ivanhoe," "Old Mortality," "Quentin Durward," "Rob Roy," or "The Talisman;" Jane Austen's novels, any *one*; Maria Edgeworth's "Castle Rackrent" or "The Absentee;" Dickens's novels, any *one*; Thackeray's novels, any *one*; George Eliot's novels, any *one*; Mrs. Gaskell's "Cranford;" Kingsley's "Westward Ho!" or "Hereward the Wake;" Reade's "The Cloister and the Hearth;" Blackmore's "Lorna Doone;" Hughes's "Tom Brown's School Days;" Stevensons "Treasure Island," "Kidnapped" or "Master of Ballantrae;" Cooper's novels, any *one*; Poe's "Selected Tales;" Hawthorne's "The House of the Seven Gables," "Twice Told Tales" or "Mosses from an Old Manse;" a collection of short stories by various standard writers.

Group IV. Essays, Biography, etc. — Addison and Steele's "The Sir Roger de Coverley Papers" or selections from the "Tattler" and "Spectator" (about 200 pages); selections from Boswell's "Life of Johnson" (about 200 pages); Franklin's "Autobiography;" Irving's selections from the "Sketch Book" (about 200 pages) or "Life of Goldsmith;" Southey's "Life of Nelson;" Lamb's selections from the "Essays of Elia" (about 100 pages); Lockhart's selections from the "Life of Scott" (about 200 pages); Thackeray's "Lectures on Swift, Addison, and Steele in the English Humorists;" Macaulay: any one of the following of Macaulay's essays: "Lord Clive," "Warren Hastings," "Milton," "Addison," "Goldsmith," "Frederic the Great," "Madame d'Arblay;" Trevelyan's selections from the "Life of Macaulay" (about 200 pages); Ruskin's "Sesame and Lilies" or "Selections" (about 150 pages); Dana's "Two Years before the Mast;" Lincoln's "Selections," including at least the two "Inaugurals," the "Speeches in Independence Hall and at Gettysburg," the "Last Public Address," the "Letter to Horace Greeley," together with a brief memoir or estimate of Lincoln; Parkman's "The Oregon Trail;" Thoreau's "Walden;" Lowell's "Selected Essays" (about 150 pages); Holmes's "The Autocrat of the Breakfast Table;" Stevenson's "An Inland Voyage" and "Travels with a Donkey;" Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge," "A Liberal

---

[1] If not chosen for study under B.

Education" and "A Piece of Chalk;" a collection of "Essays" by Bacon, Lamb, De Quincey, Hazlitt, Emerson, and later writers; a collection of "Letters" by various standard writers.

Group V. Poetry. — Palgrave's "Golden Treasury" (first series), books II. and III., with special attention to Dryden, Collins, Gray, Cowper and Burns; Palgrave's "Golden Treasury" (first series), Book IV., with special attention to Wordsworth, Keats and Shelley (if not chosen for study under B); Goldsmith's "The Traveller" and "The Deserted Village;" Pope's "The Rape of the Lock;" a collection of English and Scottish ballads, as, for example, some "Robin Hood" ballads, "The Battle of Otterburn," "King Estmere," "Young Beichan," "Bewick and Grahame," "Sir Patrick Spens," and a selection from later ballads; Coleridge's "The Ancient Mariner," "Christabel" and "Kubla Khan;" Byron's "Childe Harold," Canto III. or IV., and "The Prisoner of Chillon;" Scott's "The Lady of the Lake" or "Marmion;" Macaulay's "The Lays of Ancient Rome," "The Battle of Naseby," "The Armada," "Ivry;" Tennyson's "The Princess" or "Gareth and Lynette," "Lancelot and Elaine," and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Hervé Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City," "The Italian in England," "The Patriot," "The Pied Piper," "De Gustibus," "Instans Tyrannus;" Arnold's "Sohrab and Rustum" and "The Forsaken Merman;" selections from American poetry, with special attention to Poe, Lowell, Longfellow and Whittier.

(B) *Study:* This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

Group I. Drama. — Shakspere's "Julius Cæsar," "Macbeth," "Hamlet."

Group II. Poetry. — Milton's "L'Allegro," "Il Penseroso" and either "Comus" or "Lycidas;" Tennyson's "The Coming of Arthur," "The Holy Grail" and "The Passing of Arthur;" the selections from Wordsworth, Keats and Shelley in Book IV. of Palgrave's "Golden Treasury" (first series).

Group III. Oratory. — Burke's "Speech on Conciliation with America;" Macaulay's "Speech on Copyright" and Lincoln's "Speech at Cooper Union;" Washington's "Farewell Address" and Webster's "First Bunker Hill Oration."

Group IV. Essays. — Carlyle's "Essay on Burns," with a selection from Burns's "Poems;" Macaulay's "Life of Johnson;" Emerson's "Essay on Manners."

French. — The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a single credit unit in French as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

GERMAN. — The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).

Third and fourth year German (elective subjects for admission). — For a single credit unit in German as an elective subject for entrance, when required units have been offered in German, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

GREEK.[1] — Greek will receive credit as an elective requirement upon either examination or certification, as follows: —

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first four books of Xenophon's "Anabasis," and (*b*) the translation of passages of Attic prose at sight.

B. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages from the first six books of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the form and constructions of the passages.

LATIN. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (*b*) the translation of passages of Latin prose at sight.

B. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from either books I. to VI. of Virgil's "Æneid," or six orations of Cicero, including those against Catiline; and (*b*) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," books I. to IV.

COMMERCIAL GEOGRAPHY. — Preparation should be given in a course equivalent to that laid down in Adam's "Commercial Geography," Trotter's "Geography of Commerce," or a similar work.

DRAWING. — Applicants may offer either freehand or mechanical drawing, or both. They must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable them to draw correctly a simple geometric model from memory; or, if they present mechanical drawing, they must have considerable working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented see "Manual Training."

---

[1] Examination given in September only.

MANUAL TRAINING. — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

E. ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. OTHER INFORMATION ABOUT ENTRANCE.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)
2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.
3. Candidates must receive credit for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. No candidate deficient in both algebra and plane geometry will be admitted.
4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination, in the week following the Thanksgiving recess. (2) Second entrance condition examination, in the sixteenth week of the first semester.
5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.
6. Examinations in part of the subjects required for entrance may be taken one year before entering college.
7. For information concerning expenses, scholarships, etc., see "General Information."
8. For information concerning admission to short courses see "Short Courses."
9. All requests for information concerning admission of unclassified students should be addressed to Prof. E. A. White, chairman of committee on unclassified students.

G. Unclassified Students.

Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

1. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-years high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

2. No applicant under twenty-one years of age will be admitted as an unclassified student.

3. Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

4. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

5. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

6. All unclassified students are subject to the supervision of a special committee.

7. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

8. Unclassified students are subject to the regulations applying to classified students.

9. No student of this or any other institution who has not done efficient work therein shall be permitted to register as an unclassified student.

10. No unclassified student shall be allowed to participate in any intercollegiate contests.

COURSES OF INSTRUCTION.

A. TABLE OF FRESHMAN AND SOPHOMORE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

FRESHMAN YEAR.

First Semester.

[All work required.]

Chemistry,	3
Algebra,	3
Solid Geometry,[1]	2
English,	4
Public Speaking (at option of instructor),	1
French or German,[2]	4
Drill,	1
Hygiene,	1
College Life (attendance without credit).	
	18 or 19

Second Semester.

[All work required.]

Animal Husbandry,	2
Chemistry,	3
Trigonometry,	3
Algebra,	2
English,	4
Public Speaking (if not taken in semester one),	1
French or German,	4
Drill,	1
Physical Education,	1
	20 or 21

SOPHOMORE YEAR.

First Semester.

[All work required.]

Agronomy,	3
Physics,	5
Zoölogy,	3
English,	2
French or German,	3
Tactics,	1
Drill,	1
	18

---

[1] To be taken in course when not offered for entrance.

[2] Students may continue in college the language that they present for admission, or they may take the other; but they must continue whichever language they so elect until the end of the first semester of the sophomore year. Eleven college credits are required in this language.

Second Semester.

[All courses under "Required," with any two of those under "Elective."]

[Required.]

Elementary Horticulture,	2
Botany,	4
English,	2
Agricultural Industry,	3
Drill,	1
Tactics,	1
Physical Education,	1
	14

[Elective.]

French or German, Animal Husbandry, Geology, Physics, Chemistry, Surveying,	Each 3 hours. Any two,	6
		20

B. MAJORS: JUNIOR AND SENIOR YEARS.

GENERAL STATEMENT.

A major consists of 30 hours of correlated work, to be arranged by the student and an instructor called the adviser. The special provisions applying to the class of 1913 are given in the footnote.[1]

The list of courses found under each major on subsequent pages should not be considered as necessarily a rigid program to be followed. The heads of departments have suggested this series of courses as the best for the average man majoring in their department. Advisers may, however, make modifications to suit the particular needs of the student, provided these modifications conform precisely to the class schedule as published for the year.

RULES.

RULE 1. *Election.* — Each student, in the second semester of his sophomore year, shall elect a major subject from the list of majors given below; and this major shall consist of 30 credit hours of correlated work.

RULE 2. *Minimum Credits.* — The minimum number of credits for the junior and senior years shall be 65, inclusive of Military Drill and Physical Education.

RULE 3. *Maximum Credits.* — The maximum number of credits for any semester of the junior or senior year shall be 21.

RULE 4. *Humanities and Rural Social Science.* — A minimum of 15 credit hours in the Divisions of the Humanities and Rural Social Science shall be required of all students during their junior and senior years, with the following restriction: that a minimum of 3 credit hours will be required in each of the divisions.

RULE 5. *Advisers.* — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student intends to elect his major. Each student should consult with the adviser as soon as possible. The adviser has full authority to prescribe the student's work up to 30 hours. It is understood, however, that so far as practicable the individual needs of the student will be recognized. It is also hoped and expected that students will be disposed to seek the counsel of the adviser with respect to the remaining courses required for graduation.

RULE 6. *Free Electives.* — Each student is required to take 30 hours in his major and also 15 hours in the Divisions of the Humanities and Rural Social Science, making a total of 45 hours. He is allowed free choice for the remaining part of his required hours, this remainder amounting to 15 hours minimum for the two years, or 35 hours maximum.

---

[1] Since it will not be possible for the class of 1913 to conform fully with the regulations concerning majors given above, the following regulations will apply to them in making their elections: —

As stated below, the minimum semester credits will be 15 hours, the maximum 21 hours, and the members of the class of 1913 will fill out their elective cards with these facts in mind. For the class of 1913 the required work after the sophomore year is to be counted as follows: —

5 credits in the junior year in Military Science and Physical Education.
3 credits in Economics 1.
3 credits in English, in other subjects in the Humanities, or in Rural Social Science.

RULE 7. *Registration.* — No upper classman shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the registrar's office on June 5.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the year and will countersign the same.

(3) Each course card must be filled out, giving the name of student, with his college address, also the name of parent or guardian, with the home address. When the elections have been entered on this card, and the balance of hours added by the student, the card must be returned to the registrar not later than June 16.

RULE 8. *Changes.* — Applications for changes may be made to the dean in writing at any time, and, when approved by him and by the committee on scholarship, become operative at the beginning of the semester following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

LIST OF MAJORS.

Agriculture.

Prof. JAMES A. FOORD, Adviser.

Course.	Credit.
Agronomy 3,	3
Agronomy 6,	3
Animal Husbandry 3,	3
Animal Husbandry 5,	3
Animal Husbandry 6,	1
Animal Husbandry 9,	3
Dairying 1,	3
Dairying 2,	3
Farm Administration 3,	3
Farm Administration 4,	3
Veterinary Science 1,	3
	31

Agronomy.

Associate Prof. SIDNEY B. HASKELL, Adviser.

Course.	Credit.
Agronomy 3,	3
Agronomy 4,	3
Agronomy 5,	3
Agronomy 6,	3
Agronomy 8,	3
Animal Husbandry 5,	3
Animal Husbandry 9,	3
Farm Administration 4,	3
Chemistry 7,	3
Chemistry 8,	3
	30

Animal Husbandry.

Associate Prof. J. Allan McLean, Adviser.

Course.	Credit.
Agronomy 3,	3
Animal Husbandry 3,	3
Animal Husbandry 5,	3
Animal Husbandry 6,	1
Animal Husbandry 8,	2
Animal Husbandry 9,	3
Animal Husbandry 10,	3
Animal Husbandry 11,	2
Dairying 1,	3
Farm Administration 3,	3
Farm Administration 4,	3
	29

Dairying.

Associate Prof. William P. B. Lockwood, Adviser.

Course.	Credit.
Animal Husbandry 5,	3
Animal Husbandry 6,	1
Animal Husbandry 8,	2
Animal Husbandry 9,	3
Animal Husbandry 11,	2
Dairying 1,	3
Dairying 2,	3
Dairying 3,	3
Dairying 4,	3
Farm Administration 3,	3
Farm Administration 4,	3
	29

Poultry Husbandry.

Associate Prof. John C. Graham, Adviser.

Course.	Credit.
Poultry Husbandry 1,	2
Poultry Husbandry 2,	2
Poultry Husbandry 3,	1
Poultry Husbandry 4,	1-3
Poultry Husbandry 5,	1
Poultry Husbandry 6,	3
Poultry Husbandry 7,	3
Poultry Husbandry 9,	3
Pomology 1,	3
Agronomy 3,	3
Animal Husbandry 5,	3
Animal Husbandry 9,	3
Veterinary Science 1,	3
	31

General Horticulture.

Prof. Frank A. Waugh, Adviser.

This major will consist of courses selected from the Departments of Pomology, Floriculture, Market Gardening, Landscape Gardening and Forestry, to suit the particular needs of the student. In special cases, courses from the Department of Agronomy will also be counted toward the major in general horticulture.

Floriculture.

Prof. Edward A. White, Adviser.

Course.	Credit.
Floriculture 1,	4
Floriculture 2,	4
Floriculture 3,	3
Floriculture 4,	3
Horticulture 3,	3
Horticulture 4,	3
Entomology 1,	3
Market Gardening 2,	3
Botany 2,	4
	30

Note. — Horticulture 3 and 4 is a junior subject, but to balance the work for the two years it would be better for the floricultural students to take the course in the senior year.

Forestry.

Prof. William D. Clark, Adviser.

Course.	Credit.
Forestry 1,	3
Forestry 2,	3
Forestry 3,	3
Forestry 4,	3
Forestry 5,	2
Forestry 6,	2
Entomology 5,	3
Horticulture 3,	3
Horticulture 4,	3
Botany 13,	4
	29

Landscape Gardening.

Prof. Frank A. Waugh, Adviser.

Course.	Credit.
Landscape Gardening 1,	3
Landscape Gardening 2,	3
Landscape Gardening 3,	3
Landscape Gardening 4,	3
Landscape Gardening 5,	2
Landscape Gardening 6,	2
Landscape Gardening 7,	3
Landscape Gardening 8,	3
Drawing 1,	3
Drawing 2,	3
Horticulture 3,	3
	31

Landscape Gardening 6 will probably be given quite differently in alternate years, and thus should be open to *both* juniors and seniors.

Courses for juniors *only:* Landscape Gardening 1 and 2, Drawing 1 and 2.

Courses for seniors and graduates *only:* Landscape Gardening 7 and 8.

Courses open to juniors and seniors, both if possible: Horticulture 3 and 4 and possibly Landscape Gardening 3 and 4.

This grouping of subjects is offered only as an example. Other groupings may be approved by the adviser, but such other groupings must be subject to the class schedule.

Pomology.

Prof. FRED C. SEARS, Adviser.

Course.	Credit.
Pomology 1,	3
Pomology 2,	3
Pomology 3,	3
Pomology 4,	3
Botany 5,	2
Botany 7,	5
Agronomy 6,	3
Farm Administration 3,	3
Farm Administration 4,	3
Entomology 2,	3
	31

Agricultural Chemistry.

Associate Prof. CHARLES A. PETERS, Adviser.

Course.	Credit.
Chemistry 5,	5
Chemistry 6,	5
Chemistry 9,	5
Chemistry 10,	5
Chemistry 11,	5
Chemistry 12, 14 or 16,	5
Chemistry 13,	3
Chemistry 15,	3
Chemistry 18,	2
	38

The major will consist of 30 credit hours selected from this list. The student will be advised concerning other subjects suited to be taken in connection with Chemistry.

Economic Entomology.

Prof. HENRY T. FERNALD, Adviser.

Course.	Credit.
Entomology 1,	3
Entomology 2,	2
Entomology 3,	4
Entomology 4,	4
Entomology 5,	3
Entomology 8,	3
Botany 3,	4
Botany 4,	2
Zoölogy 3,	3
Zoölogy 4,	3
	31

A major in Economic Entomology does not necessarily include all the subjects given in this list, but may be varied to some extent, in accordance with the future plans of the student, other modifications being permissible.

Plant Physiology and Pathology.

Prof. George E. Stone, Adviser.

Course.	Credit.
Botany 3,	4
Botany 4,	2
Botany 10,	4 or 5
Botany 14,	4
Chemistry 5,	5
Chemistry 6,	5
Entomology 1,	3
Entomology 2,	2
	29 or 30

Agricultural Education.

Prof. William R. Hart, Adviser.

Course.	Credit.
Agricultural Education 1,	3
Agricultural Education 2,	3
Agricultural Education 3,	2
Agricultural Education 4,	3
Agronomy 3,	3
Dairying 5,	2
Farm Administration 3,	3
Poultry Husbandry 1,	2
Market Gardening 2, Agronomy 5,	3
Botany 5,	2
Pomology 1,	3
	29

Some substitutions of other technical courses for some of the technical courses above mentioned will be made to meet the needs of individual students.

SUMMARY.

There are four preliminary steps which a student should take in arranging for his major work.

1. Select a major.
2. Confer with major adviser for arrangement of courses, the plan to be approved by adviser in accordance with Rule 5 previously stated.
3. Select courses covering the four semesters of the junior and senior years in such a way that a minimum of 15 credits will be taken in the two Divisions, the Humanities and Rural Social Science; the distribution of all but 3 of these credits may be decided by the student.
4. Choose other courses so that the total number of credits for any semester shall be not less than 16 nor more than 21. (See Rules 2 and 3.)

C. UNDERGRADUATE COURSES.

[All courses given in the first semester bear odd numbers; all given in the second semester bear even numbers. Studies are pursued in courses, "course" implying the study given a subject within one semester, without regard to the total number of hours or to the number of credits. The special mention of certain courses as prerequisite to other courses does not imply that no courses but those so mentioned are "preliminary or preparatory" within the meaning of the Book of Rules.]

DIVISION OF AGRICULTURE.

Professor FOORD.

AGRONOMY.

Associate Professor HASKELL, Dr. BROOKS, Mr. MCDONALD.

Required Course.

1. SOILS AND FERTILIZERS. — A study of the formation, classification and physical and chemical properties of soils. This is followed by study of methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments. Prerequisites, Chemistry 1 and 2. Sophomores; 3 hours. Credit, 3.
Associate Professor HASKELL and Mr. MCDONALD.

Elective Courses.

3. FIELD AND FORAGE CROPS. — History, classification, cultivation, harvesting, commercial grading and valuation. The crops studied are the cereal grains, grasses, legumes, forage and root crops suitable to New England conditions. The work includes lecture, laboratory and field study of these various crops. Prerequisites, Agronomy 1 and Botany 2. For juniors primarily; 1 lecture and 2 laboratory periods. Credit, 3.
Mr. MCDONALD.

4. ADVANCED FIELD CROPS. — Commercial production of grain, hay and root crops. Lecture, laboratory, and field study of the purity, quality, and vitality of the seed of these crops and the handling, grading and judging of their products. The work offered will not be confined to New England conditions. Prerequisite, Agronomy 3. For juniors primarily; 2 lectures and 1 laboratory period. Credit 3. Mr. MCDONALD.

5. ADVANCED SOILS. — A field, laboratory and lecture course on soils; their nature, composition, physical qualities, improvement. Field work, as far as the season allows, consists of detailed soil surveys in different parts of the Connecticut valley; this followed by laboratory work on the physical properties of the soil collected, on the effect of fertilizers on the soil, and on the mixing of fertilizers. Prerequisites, Agronomy 1 and Chemistry 1 and 2. For seniors primarily; 1 lecture period and 1 4-hour laboratory period weekly. Credit, 3. Associate Professor HASKELL.

6. Drainage and Irrigation. — A field and lecture course on soil improvement, by drainage and irrigation. As a thesis each man is required, after studying an area of wet or swampy land, to present plans and estimates for its reclamation. Prerequisites, Agronomy 1 and Mathematics 8. Juniors and seniors; 1 lecture period and 1 4-hour laboratory period weekly. Credit, 3. Associate Professor Haskell.

8. Manures and Fertilizers. — An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Each of the important manures and fertilizers will be discussed, its origin and its chemical and physical characteristics being considered. Each material taken up will be studied in relation to its capacity to supply plant food and to its effects upon soil texture, moisture, temperature and flora. Considerable attention will be devoted to consideration of the experimental work which has been done, and which is now in progress, in manures and fertilizers. This course is intended for seniors only. Prerequisite, Agronomy 1; 3 lectures a week, with occasional seminars. Credit, 3. Dr. Brooks and Associate Professor Haskell.

ANIMAL HUSBANDRY.

Associate Professor McLean, Mr. Quaife.

Required Course.

2. Elementary Judging. — A study of the different market classes and grades of horses, cattle, sheep and swine. The purpose of this course is to familiarize beginners with the different classes of stock, and to give them a grounding in live stock judging. Text-book, Craig's "Live Stock Judging." Freshmen; 2 laboratory periods. Credit, 2.
Associate Professor McLean and Mr. Quaife.

Elective Courses.

3. Breeds and Types of Live Stock. — A course covering the origin, history, development and characteristics of the different breeds of horses, cattle, sheep and swine. Text-book, Plumb's "Breeds and Types of Farm Animals." Prerequisite, Animal Husbandry 2. Sophomores; 1 lecture and 2 laboratory periods. Credit, 3. Mr. Quaife.

5. Principles of Breeding. — Text-book, Davenport's "Principles of Breeding." Prerequisite, Zoölogy 1. Juniors; 3 lectures. Credit, 3.
Associate Professor McLean.

6. Live-Stock Management. — The work of this course consists of laboratory work by the individual students in the handling of live stock; with horses, such work as halter breaking, breaking to drive, driving, harnessing, casting, and fitting for show will be done; similarly, the practical handling of cattle, sheep and swine will be fully treated. Special study is given to halter making, splicing, hitches, knots and all rope work. Prerequisite, Animal Husbandry 3. Juniors; 1 laboratory. Credit, 1. Mr. Quaife.

8. ADVANCED STOCK JUDGING. — This course is designed to equip Animal Husbandry students in the judging of classes of different types of live stock, to strengthen them in the selection of superior sires, and equip them for stock judging at fairs. Visits will be made to the best herds for the various breeds of stock in the State. Judging teams to represent the college will be selected largely from this class. Prerequisite, Animal Husbandry 3. Juniors; 2 laboratory periods. Credit, 2.

Associate Professor MCLEAN.

9. FEEDING AND MANAGEMENT. — A study of the principles of animal nutrition; of the composition and qualities of feeding materials; of the feeding, care and management of dairy cattle from birth to maturity, with especial attention to economic production; a similar study of beef animals and beef production. Text-book, Henry's "Feeds and Feeding." Prerequisite, Animal Husbandry 3. Seniors; 3 lectures. Credit, 3.

Associate Professor MCLEAN and Mr. QUAIFE.

10. FEEDING AND MANAGEMENT. — A continuation of Course 9, dealing in a similar manner with horses, sheep and swine. Prerequisite, Course 9. Seniors; 3 lectures. Credit, 3.

Associate Professor MCLEAN and Mr. QUAIFE.

11. HERD AND STUD-BOOK STUDY. — An advanced course in the study of the breeds of live stock, familiarizing the student with the most productive sires and dams of the various breeds, and the successful lines and methods of breeding. Prerequisites, Animal Husbandry 5 and 8. Seniors; 2 hours. Credit, 2. Associate Professor MCLEAN.

DAIRYING.

Associate Professor LOCKWOOD, Professor MARSHALL, Mr. STORY, Mr. COONS.

Elective Courses.

1. MILK AND MILK COMPOSITION. — The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; the study of analysis of milk products by use of the Babcock test for fat, test for acidity and adulteration, and ordinary preservatives; moisture tests for butter; methods for testing herds and developing them to higher efficiency; problems. Two lecture hours and 1 2-hour laboratory period. Credit, 3.

Associate Professor LOCKWOOD.

2. BUTTERMAKING. — A study of separators and cream separation; handling milk and cream for buttermaking; preparation of starters, and ripening cream; churning; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy machinery and care thereof. Prerequisite, Course 1; one lecture hour and 2 2-hour laboratory periods. Credit, 3. Associate Professor LOCKWOOD.

3. DAIRY BACTERIOLOGY. — A study of bacteriology relative to market milk and dairy work. Prerequisites, Courses 1 and 2, Bacteriology 1; 3 2-hour laboratory periods. Credit, 3. Professor MARSHALL.

4. Market Milk and Milk Products. — A study of market milk conditions, extent and development of the business; supply and delivery; food value of milk and its use as food; milk and its relation to the public health; methods for the proper handling and preparing of milk and cream for direct consumption; certified milk, requirements and production; pasteurizing; sterilizing; standardizing and modifying; milk laws and inspection. The manufacture of milk products other than butter, including cheese, condensed milk, cottage cheese, casein, milk powder, ice cream, etc. Prerequisites, Dairying 1, and Bacteriology 1; two lecture hours and 1 2-hour laboratory period. Credit, 3. Associate Professor Lockwood.

5. Dairying. — A course designed primarily for teachers of secondary agriculture. The work given will cover briefly the composition and secretion of milk, the Babcock fat test, the relation of bacteria to dairy work and principles of creaming; separators; elementary buttermaking; proper methods of handling milk and cream; and the relation of market milk to the public health. One lecture hour and 1 2-hour laboratory period. Credit, 2. Associate Professor Lockwood.

FARM ADMINISTRATION.

Professor Foord.

Elective Courses.

3. Farm Buildings and Machinery. — A study of the material equipment of the farm aside from the land; farm buildings, their location, plan and arrangement; water supply; fencing problems; farm power; farm machinery; wagons. Prerequisites, Agronomy 1, Animal Husbandry 2, Physics 1. Primarily for seniors; 2 laboratory periods and 1 lecture hour. Credit, 3. Professor Foord.

4. Farm Management. — The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts. Prerequisites, Agronomy 1 and 3, Animal Husbandry 2 and 3. Primarily for seniors; 2 lecture or recitation hours and 1 laboratory period. Credit, 3. Professor Foord.

POULTRY HUSBANDRY.

Associate Professor Graham, Mr. Brown.

Elective Courses.

1. Elements of Poultry Culture. — This course consists of a comprehensive study of poultry-house construction, poultry-house equipment, winter-egg production, types and breeds of poultry. Juniors; 2 lectures. Credit, 2. Associate Professor Graham.

2. Elements of Poultry Culture. — This is a continuation of Course 1, treating the subjects of incubation, brooding, care of growing stock, market poultry, including capons, roasters and broilers, and diseases of poultry. Juniors; 2 lectures. Credit, 2. Associate Professor Graham.

3. POULTRY PRACTICE WORK. — This is a practical laboratory course in poultry carpentry, caponizing, killing and picking; dressing and packing poultry, sorting and preparing eggs for market. Must be preceded or accompanied by Course 1. Juniors; 1 laboratory period. Credit, 1.
Mr. BROWN.

4. INCUBATION AND BROODING. — In this course students are required to set up and operate incubators and brooders, make a systematic study of the development of the chick in the egg, and the care of sitting hens. This course must be preceded or accompanied by Course 2. Juniors; time to be arranged. Credit, 1 to 3. Mr. BROWN.

5. PEN MANAGEMENT. — This is a practical laboratory course. Students are required to care for a pen of fowls, keeping accurate records of eggs produced, food consumed, weather conditions, health of fowls, and profit and loss; must be preceded or accompanied by Course 1. Juniors; time to be arranged. Credit, 1. Mr. BROWN.

6. POULTRY MANAGEMENT. — In this course a detailed study of large poultry farms and equipment, such as bone cutters, feed cutters, cramming machines, etc., will be carried on. It includes the laying out and planning of poultry buildings of all kinds, the mating of fowls, and the preparing of birds for exhibition. Attention to poultry diseases and investigation work carried on by experiment stations is prominent in this course. A few good poultry plants will be visited by the class for practical demonstrations. Prerequisites, Courses 1, 2, 3 and 4. Seniors; 2 lectures, 1 laboratory period. Credit, 3. Associate Professor GRAHAM and Mr. BROWN.

7. ADVANCED POULTRY JUDGING. — This course includes a study of the origin and history of breeds and varieties, poultry organizations and poultry shows. The American Standard of Perfection will be used as a text. Prerequisites, Courses 1, 2, 3, 4 and 5. Seniors; 1 lecture and 2 laboratory periods. Credit, 3. Associate Professor GRAHAM and Mr. BROWN.

9. MARKET POULTRY AND POULTRY PRODUCTS. — This course includes the study of market classifications of poultry, eggs and feathers; the requirements of different markets, methods of marketing, advantages and disadvantages of cold storage of poultry and eggs. Students will be required to fatten several lots of chickens by different methods and rations. Accurate data must be kept showing the gain in weight and quality, also the cost of feed, labor, etc., and the profit and loss. Judging and scoring of market poultry, both alive and dressed, and market eggs will be an important feature of this course. Prerequisites, Courses 1, 2 and 3. Seniors; 1 lecture or conference period and laboratory periods to be arranged. Credit, 3.
Associate Professor GRAHAM and Mr. BROWN.

DIVISION OF HORTICULTURE.

Professor WAUGH.

[The general subject of horticulture divides naturally into the subjects of pomology, floriculture, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore grouped here under the general designation of horticulture.]

Required Course (General).

2. NURSERY PRACTICE. — This course treats of the fundamental operations of horticulture — propagation, pruning, cultivation — as related to the physiology of the plant. Lectures and practicums; Bailey's "Nursery Book" as text in propagation. Sophomores; 2 hours. Credit, 2.

Mr. CHENOWETH.

Elective Courses (General).

3. PLANT MATERIALS. — This course aims to make the student familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them. Prerequisite, Horticulture 2; 2 lecture periods and 1 laboratory period. Credit, 3.

Professor WHITE.

4. PLANT MATERIALS. — A continuation of Course 3, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions. Prerequisite, Horticulture 3; 2 lecture periods and 1 laboratory period. Credit, 3. Professor WHITE.

6. PLANT BREEDING. — This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops. Seniors and graduates; open only to students well prepared in agricultural or horticultural subjects; 2 lecture periods and 1 2-hour laboratory period. [Not given in 1913–14.] Credit, 3.

FLORICULTURE.

Professor WHITE.

Elective Courses.

1. GREENHOUSE MANAGEMENT. — This course is designed to familiarize students with methods followed in the management of greenhouse crops. The students are instructed in the practical operation of glazing concrete, bench construction, bulb culture, greenhouse watering, fumigating and ventilating, in the care of furnaces, and in the methods of propagation of green-

house plants by seeds and cuttings. This is designed as a laboratory course, and students electing it will be expected to arrange their hours according to the needs of the work. Prerequisite, Horticulture 2. Juniors; 7 hours a week. Credit, 4. Professor WHITE.

2. GREENHOUSE MANAGEMENT. — A continuation of Course 1, including also a study of the location, arrangement and construction of greenhouses; the drawing of plans for commercial and private ranges, to show foundations and details in construction of superstructure; arrangement of heating pipes; estimate of comparative cost of different methods of construction; drafting specifications. Design making and table decorations are considered in this course. Juniors; prerequisite, Floriculture 1; 7 hours as stated under Course 1. Credit, 4. Professor WHITE.

3. FALL GREENHOUSE CROPS. — A study of important fall and winter crops and their care, — chrysanthemums, carnations, violets, roses, palms and various conservatory plants; the importation, purchase and growth of bulbous material; the preparation of material for forcing; house and church decorating. Lectures, text-books and laboratory exercises. Prerequisites, Floriculture 1 and 2. Seniors; 5 hours. Credit, 3. Professor WHITE.

4. SPRING GREENHOUSE CROPS. — The culture of individual crops in their relation to spring work in a florist establishment. A critical study of methods of propagating bedding plants, the nature and use of these plants, practice in planting them and in the spring care of herbaceous perennials and wholesale and retail marketing of spring plants. Lectures, text-books and practical exercises. Seniors; prerequisites, Floriculture 1, 2 and 3; 5 hours. Credit, 3. Professor WHITE.

FORESTRY.

Professor CLARK.

Elective Courses.

1. PRINCIPLES OF FORESTRY. — A lecture course for the purpose of giving the students a general view of the whole field of forestry and what forestry attempts to accomplish and has accomplished. Two lectures; juniors and seniors; not required of students who propose to major in forestry. Credit, 2. Professor CLARK.

3. DENDROLOGY. — During the first part of the semester frequent field trips will be made to identify and study the habits of our native forest trees. Later, the classification, range, distribution, forest habits, quality, uses and identification of wood of the commercial timber trees of the United States will be studied. Two 2-hour periods; lectures, recitations, laboratory or field work at option of instructor; juniors. Credit, 3. Professor CLARK.

4. SILVICULTURE. — Factors influencing forest growth; forest types; silvicultural systems; care and protection of forests; forest description; forest nursery practice and forest planting. Three lectures weekly until May 1; during May and June, one lecture and one 4-hour field period weekly; juniors. Prerequisite, Forestry 3. Credit, 3. Professor CLARK.

5. Forest Mensuration. — Methods of determining the volume of trees, logs and entire forests. Methods of computing volume tables, tree and forest growth and yield tables. Timber estimating. Three lectures; 72 hours of field work; seniors. Credit, 5. Professor Clark.

6. Forest Valuation and Regulation. — Methods of determining the costs of growing timber crops and of arriving at the value of future growth or standing immature growth. Methods of regulating the harvest of crops so as to secure a sustained or annual yield. Prerequisite, Forestry 5; seniors; 3 lectures. Credit, 3 Professor Clark.

LANDSCAPE GARDENING.

Professor Waugh, Mr. Harrison.

Elective Courses.

1. Elements of Landscape Gardening. — Reconnoissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected designs of leading landscape gardeners; grade design, road design and field work. Students should have preparation in surveying, mathematics, plant materials and drawing. Must be followed by Course 2. Juniors; 6 hours a week. Credit, 3. Mr. Harrison.

2. Elements of Landscape Gardening. — As stated under Course 1. Prerequisite, Course 1.

3. General Design. — Field notes; examination of completed works and those under construction; design of architectural details, planting plans, gardens and parks and private grounds; written reports of individual problems. Seniors; prerequisites, Landscape Gardening 1 and 2, and either plant materials (Horticulture 3 and 4) or advanced mathematics; must be followed by Course 4; 6 hours. Credit, 3. Professor Waugh.

4. General Design. — As stated under Course 3. Prerequisite, Course 3.

5. Theory of Landscape Art. — The general theory and applications of landscape study, including a brief history of the art. Seniors and graduates; 2 hours. Credit, 2. Professor Waugh.

6. Architecture. — The history of architectural development, the different historic types, with special reference to the underlying principles of construction and design and their relations to landscape design. Illustrated lectures, conferences, practice in designing; 2 hours. Credit, 2. (Alternating with Course 10.) Mr. Harrison.

7. Civic Art. — The principles and applications of modern civic art, including city design, city improvement, village improvement and rural improvement. Prerequisites, Courses 1, 2 and 3; must be followed by Course 8; 6 hours. Credit, 3. Professor Waugh.

8. Civic Art. — As stated under Course 7. Prerequisite, Course 7.

10. Construction and Maintenance. — Detailed instruction in methods of construction and planting in carrying out plans, in organization, reporting, accounting, estimating, etc.; maintenance work in parks and on estates, its organization, management, cost, etc. Two hours. Credit, 2. (Alternating with Course 6 and not to be given in 1912–13.) Mr. Harrison.

MARKET GARDENING.

Assistant Professor Yeaw.

Elective Courses.

2. Elements of Market Gardening. — A course designed for an introduction to market gardening as a business. The work consists primarily of actual field experience in handling vegetable crops from seed to maturity. This is supplemented with lectures and text-book, in which a study of methods, soils, fertilization, tillage and management is made. Juniors; 5 hours. Credit, 3. Assistant Professor Yeaw.

3. Advanced Market Gardening. — A continuation of the work begun in Market Gardening 2, taking up problems of seed growing, selection of varieties, crop management, harvesting, storage and marketing. A study is made of the greenhouse vegetable industry, and considerable time devoted to growing the special forced crops. Some time is given to a systematic study of vegetable description, classification and nomenclature. Collateral reading is required. Seniors; prerequisite, Market Gardening 2; 5 hours. Credit, 3. Assistant Professor Yeaw.

POMOLOGY.

Professor Sears, Mr. Chenoweth, Mr. Rees.

Elective Courses.

1. Practical Pomology. — *General.* — A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of stock, pruning, spraying, etc. Text and reference books; field and laboratory exercises. Prerequisite, Horticulture 2. Juniors; 4 hours. Credit, 3. Professor Sears.

2. Practical Pomology. — *Special.* — The special application of the general principles discussed in Course 1 to the culture of the principal kinds of fruits, such as apples, pears, peaches, plums, cherries and quinces; grape culture and the culture of small fruits, such as blackberries, raspberries, currants, gooseberries and strawberries. Text-books, lectures and reference books; field and laboratory exercises. Prerequisites, Horticulture 2 and Pomology 1. Juniors; 4 hours. Credit, 3. Professor Sears.

3. Systematic Pomology. — A study of the varieties of the different fruits and of nomenclature, with critical descriptions; special reference being given to relationships and classification. Text-books, laboratory and field exercises. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 4 hours. Credit, 3. Mr. Chenoweth.

4. Commercial Pomology. — The storing and marketing of fruits; includes a discussion of storage houses, the handling and storing of fruits, fruit packages, methods of grading and packing, etc. Text and reference books; laboratory exercises. Seniors; prerequisites, Horticulture 2, Pomology 1, 2 and 3; 4 hours. Credit, 3. Mr. Chenoweth.

6. Spraying. — A study of (*a*) spraying materials, their composition, manufacture and preparation for use; the desirable and objectionable qualities of each material, formulas used, cost, tests of purity. (*b*) Spraying machinery, including all the principal types of pumps, nozzles, hose and vehicles; their structure and care. (*c*) Orchard methods in the application of the various materials used, with the important considerations for spraying each fruit and for combating each orchard pest. This course is designed especially to familiarize the student with the practical details of actual spraying work in the orchard. Spray materials are prepared, spraying apparatus is examined and tested, old pumps are overhauled and repaired, and the actual spraying is done in the college orchards and small fruit plantations. Prerequisites, Horticulture 2, Pomology 1 and 2. Seniors; 3 hours (1 lecture period and 1 laboratory period). Credit, 2.

Professor Sears.

DRAWING.

Mr. Harrison.

Elective Courses.

1. Freehand Drawing. — Lettering; freehand perspective; sketching from type models, leaves, flowers and trees, insects and small animals; laying flat and graded washes in water colors; water color rendering of leaves, flowers and trees; conventional coloring and map rendering in water colors; conventional signs and mapping in ink. Juniors; 6 hours. Credit, 3. Mr. Harrison.

2. Mechanical Drawing. — Inking exercises; geometric problems; projection; intersections, isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Students should have preparation in plane and solid geometry. Juniors; 6 hours. Credit 3.

Mr. Harrison.

DIVISION OF SCIENCE.

Professor Paige.

BOTANY.

Professor Stone, Assistant Professor Osmun, Mr. McLaughlin, Mr. Smith.

[The object of the courses in botany is to teach those topics pertaining to the science which have a bearing upon economic and scientific agriculture. Undergraduate work extending through five semesters is offered. Considerable latitude is allowed students in the senior year in their electives; and, besides the courses here outlined, students often take up the study of histology or of systematic botany, the microscopic examination of pure and adulterated human and cattle foods, spices and drugs, etc. Students sufficiently prepared are occasionally permitted to undertake special physiological and pathological investigations. A botanical conference is held monthly wherein new problems in botanical science are considered by graduate students and the seniors who elect botany.]

Required Course.

2. General Botany. — The morphology, physiology and classification of plants. This course is fundamental. Its aim is to lay a foundation for the more specialized courses in botany which follow and to provide a general knowledge of the science for those students who will not take further work in the department. This course is prerequisite to all other courses given by the department. Laboratory work consists in the microscopic study of representatives of all the more important plant groups. This phase of the work is almost entirely devoted to morphology and histology, especial attention being given to the structure of higher plants. The lectures aim to amplify and interpret the laboratory work, dealing also with the function (physiology), classification (taxonomy) and ecology of plants. Each student is required to collect and prepare an herbarium of 75 species of native plants. Gray's "New Manual of Botany" is used in determining and naming plants. Though only 1 lecture period is scheduled for this course, it is understood that laboratory hours may be used for lectures at the discretion of the instructor. Sophomores; 1 lecture; 3 laboratory periods. Credit, 4.

Assistant Professor Osmun and Mr. McLaughlin.

Elective Courses.

3. Cryptogamic Botany. — Systematic study of typical forms of the lower plants (bacteria, algæ, fungi, lichens, mosses and ferns); instruction in laboratory technique and methods, and the making of herbaria of lichens, mosses and ferns. Laboratory work and lectures; field excursions for the purpose of observing environmental habits and collecting material for laboratory study; collateral reading. This course is intended for those students who wish to specialize in biology; its purpose is to afford more thorough scientific training than is offered in Course 5, and students electing this course may attend the lectures in Course 5. Prerequisite, Botany 2. Primarily for juniors. 1 lecture hour and 3 2-hour laboratory periods. Credit, 4. Assistant Professor Osmun.

4. CRYPTOGAMIC BOTANY. — This is a continuation of Course 3. Prerequisites, Botany 2 and 3. Primarily for juniors; 1 lecture hour and 2 2-hour laboratory periods. Credit, 2. Assistant Professor OSMUN.

5. PLANT PATHOLOGY. — This course comprises a study of the common diseases of crops and consideration of the methods for their prevention and control, and is intended especially for students in horticulture and agriculture. Laboratory work and lectures. Prerequisite, Botany 2. Primarily for juniors; 1 1-hour lecture and 1 2-hour laboratory period. Credit, 2.
Professor STONE, Assistant Professor OSMUN and Mr. MCLAUGHLIN.

7. PLANT PATHOLOGY. — This course includes a study of the diseases of one or more crops and the methods of controlling them. Laboratory work and lectures, together with extensive reading of experiment station literature. The course is intended for those who wish to become more familiar with the diseases of one or more groups of economic plants. Prerequisite, Botany 2. Seniors; students who take this course and continue in botany must take Course 8; 1 lecture period and 3 3-hour laboratory periods. Credit, 5. Professor STONE.

8. PLANT PATHOLOGY. — As stated in Course 7. Prerequisite, Course 7.

9. ECONOMIC FUNGI. — This course comprises the study of economic fungi from a technical point of view, and is intended for those students who wish for a more comprehensive knowledge of the phylogenetic relationship of fungi. Laboratory work and lectures. Problems of a practical or technical nature intimately associated with the control of diseases are taken up. Special monographs and more important station literature treating of the life history of fungi, etc., are studied. Prerequisites, Botany 2, 3 and 4. Must be followed by Course 10; seniors; 1 1-hour lecture period and 2 or 3 3-hour laboratory periods. Credit, 4 or 5.
Professor STONE.

10. ECONOMIC FUNGI. — As stated in Course 9. Prerequisite, Course 9.

11. PLANT PHYSIOLOGY. — This course is largely experimental and is especially adapted to the needs of students who are taking chemistry. Laboratory work and lectures; various handbooks on plant physiology. Prerequisite, Botany 2. Must be followed by Course 12; seniors; 1 1-hour lecture period and 3 3-hour laboratory periods. Credit, 5.
Professor STONE and Mr. MCLAUGHLIN.

12. PLANT PHYSIOLOGY. — As stated in Course 11. Prerequisite, Course 11.

13. SHADE-TREE MANAGEMENT. — Physiology and pathology of shade trees. This course includes a comprehensive study of the diseases, structure and functions of trees and shrubs, and of every agency which in any way affects shade trees. Laboratory work and lectures; extensive reference reading. Designed for those students who intend to take charge of parks

or large estates, or to become tree wardens, city foresters, landscape gardeners or professional advisers and caretakers. Prerequisite, Botany 2. Must be followed by Course 14; seniors; 1 1-hour lecture period and 2 3-hour laboratory periods. Credit, 4. Professor Stone.

14. Shade-Tree Management. — Physiology and pathology of shade trees. As stated in Course 13. Prerequisite, Course 13.

GENERAL AND AGRICULTURAL CHEMISTRY.

Professors Lindsey and Wellington,[1] Associate Professors Chamberlain and Peters, Assistant Professor Anderson, Messrs. Bogue, Noyes, Fowler and Gates.

[The course in chemistry aims to teach accurate observation, logical thinking and systematic and constant industry. It likewise aims to give those students following the several agricultural occupations, or who are preparing themselves for work as teachers and investigators in the other sciences, a knowledge of the subject sufficient to enable them to apply it in their various lines of work. Students taking all of the undergraduate courses and who intend following chemistry as a vocation are prepared for positions as instructors in high schools and colleges, in the agricultural experiment stations, the United States Department of Agriculture, as well as in fertilizer, cattle food, sugar and dairy industries. Students are encouraged to take graduate work leading especially to the degree of M.Sc., and to thus prepare themselves for advanced positions as teachers in the agricultural colleges, as research chemists, and likewise for the more responsible positions connected with the different agricultural industries of the country. A fuller knowledge of the course of instruction will be found by consulting the following outline.]

Required Courses.

1. General Chemistry. — *The Non-metals.* — An introduction to the fundamental chemical laws, together with a study of the common acid-forming elements and their compounds. Kahlenberg's "Outlines of Chemistry" is used as a text. The laboratory work is of two kinds. Those beginning the subject form one division and those who present chemistry for entrance are grouped in other divisions. The advance divisions, in addition to work not usually done in high schools, study simple volumetric quantitative processes such as the determination of the hardness of water, the available oxygen in hydrogen peroxide, the chlorine in soluble chlorides, the oxygen in bleaching powder and the strengths of solutions of acids and bases. Freshmen; lectures, 2 hours; laboratory, 2 hours. Credit, 3.
Associate Professor Peters, Assistant Professor Anderson,
Mr. Bogue and Graduate Assistants.

2. General Chemistry. — *The Metals.* — A continuation of Course 1. A study of the metals and their compounds. The laboratory work takes the synthetic form. Substances of agricultural importance are prepared in quantity and studied in detail by the student. These include ammonium sulfate from gas liquor, sulfur and arsenic insecticides and superphosphates, in addition to preparations outlined in Blanchard's "Synthetic Inorganic Chemistry." Attention is paid to the subjects of mass action and colloids. Prerequisite, Course 1. Freshmen; lectures, 2 hours; laboratory, 2 hours. Credit, 3.
Associate Professor Peters, Assistant Professor Anderson.
Mr. Bogue and Graduate Assistants.

---

[1] Absent on leave, second semester; courses in charge of Associate Professor Peters.

Elective Courses.

3. QUALITATIVE ANALYSIS. — *Basic.* — A course in the systematic analysis of metallic salts, presented from the ionic viewpoint. The student studies closely the tests used in the separation and identification of the metals; he then applies these tests to unknown mixtures. Text, Gooch and Browning's "Outlines of Qualitative Analysis," with Böttger's "Qualitative Analysis" and Treadwell-Hall's "Qualitative Analysis" for reference. Prerequisite, Course 2; should be taken, particularly, by all intending to follow chemistry as a vocation. Sophomores; lecture, 1 hour; laboratory, 2 hours. Credit, 3. Assistant Professor ANDERSON and Mr. NOYES.

4. QUALITATIVE ANALYSIS. — *Acidic.* — A continuation of Course 3. A large part of the semester is spent in the examination qualitatively of minerals and of agricultural products. Prerequisite, Course 3. Sophomores; lecture, 1 hour; laboratory, 2 hours. Credit, 3.
Assistant Professor ANDERSON and Mr. NOYES.

5. ORGANIC CHEMISTRY. — This course, with Course 6, continues through the junior year. The two courses are designed especially: (1) for those who are looking forward to positions as chemists in agricultural colleges or experiment stations, the United States Department of Agriculture, or similar places, and who need a knowledge of chemistry for itself; and (2) for those who are expecting to enter like positions in other sciences, and who will use their knowledge of chemistry in a secondary way. It consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry. Especial attention is given to those compounds which are found in agricultural products or are manufactured from them. These include alcohols, acids, esters, fats, carbohydrates, proteins, etc. The work forms a foundation for courses in physiological chemistry and agricultural analysis, and thus for future work in agricultural chemical investigation. Prerequisites, Courses 1, 2, 3 and 4 (courses 3 and 4 will not be required as prerequisites for those majoring in other courses than chemistry). Juniors; those electing Course 5 are expected to elect Course 6. Lectures, 3 hours; laboratory, 4 hours. Credit, 5.
Associate Professor CHAMBERLAIN and Mr. FOWLER.

6. As stated under Course 5.

7. AGRICULTURAL CHEMISTRY. — This course and Course 8 are designed as alternatives for Courses 5 and 6. They are especially intended for those who, having completed Courses 1 and 2, do not care to continue the study of chemistry for itself, but are planning to enter practical agricultural work and desire a further knowledge of chemistry as it is related directly to practical agriculture and agricultural problems. The work is planned in two parts, viz.: *Course 7, Inorganic Agricultural Chemistry,* the study of the general composition, properties and reactions of soils and fertilizers, and in addition to this the study of some of the

more important fungicides and insecticides, and the common materials of construction, such as tile, brick, cements, paints, oils, etc.; and *Course 8, Organic Agricultural Chemistry,* the study of the composition, physiological processes, uses and nutritive value of plants, and the composition and general processes of nutrition and growth of animals; also the study of products related to plants and animals, such as milk, butter, sugar, maple syrup, denatured alcohol, wood pulp, paper, etc. The treatment of the subject in both of these courses is entirely general, avoiding all complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the chemical aspects of agricultural processes and products. Prerequisites, Courses 1 and 2. Juniors; those electing Course 7 are expected to elect Course 8. Lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor CHAMBERLAIN and Mr. FOWLER.

8. ORGANIC AGRICULTURAL CHEMISTRY. — As stated under Course 7.

9. QUANTITATIVE ANALYSIS. — Instruction in this course includes the gravimetric and volumetric determinations of some of the commoner metals and non-metals in minerals and industrial products. Aside from teaching accurate observation and care in manipulation, it is intended for those who would learn the exact methods for determining the elements, particularly, in inorganic substances, and is the forerunner of other courses intended to fit men to become expert analysts. Talbot's "Quantitative Chemical Analysis" is used as a text. Prerequisites, Courses 1, 2, 3 and 4. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.

Professor WELLINGTON and Associate Professor PETERS.

10. AGRICULTURAL CHEMICAL ANALYSIS. — In this course and Course 11 the methods previously studied, and other approved methods, are applied to the examination of agricultural materials. The analysis of fertilizers, insecticides, fungicides and soils is followed by that of cattle foods, dairy products, sugars, starches and allied substances. Prerequisite, Course 9. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.

Professor WELLINGTON, Associate Professor PETERS.

11. AGRICULTURAL CHEMICAL ANALYSIS. — As stated under Course 10. Prerequisite, Course 10. Seniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5. Professor WELLINGTON and Assistant.

13. PHYSIOLOGICAL CHEMISTRY. — This course is intended to be supplementary to Courses 5 and 6 and Courses 7 and 8. To those who expect to take up scientific work in botany, agronomy, animal husbandry and bacteriology, and who have had Courses 5 and 6, it will give acquaintance with the chemistry of the physiological processes in plants and animals, by means of which some of the important organic compounds studied in Courses 5 and 6 are built up in the living organism or are used as food by it. In the lectures the study of food and nutrition as related to both human and domestic animals is the principal subject. In the laboratory,

experimental studies are made of the animal body and the processes and products of digestion, secretion and excretion. The course gives additional training in the chemical problems of agricultural experiment station work, especially those connected with investigations in animal and plant nutrition. To those who will not take up scientific lines of work, but will follow practical agriculture, it will give an opportunity for a more detailed study of the chemistry and physiology of problems which were treated generally in Courses 7 and 8. Prerequisites, preferably, Courses 5 and 6 or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor CHAMBERLAIN and Mr. FOWLER.

[GENERAL STATEMENT CONCERNING COURSES 12, 14 AND 16. — Each student electing either of these courses will be required to take up and follow out some special line of work, the object being to acquaint him with methods of original inquiry. A single concrete example may be found in a comparative study of the different methods for the determination of the several forms of nitrogen. A thesis may not be required, but frequent consultation of the literature bearing on the subject will be necessary. These courses are valuable for all chemists, and particularly so for those intending to take up experiment station work. A student may choose any one but not two of these separate courses.]

12. SPECIAL WORK IN AGRICULTURAL CHEMICAL ANALYSIS. — Topics for laboratory study will be assigned to each student. Prerequisite, Course 11. Seniors; laboratory, 10 hours. Credit, 5.

Professor WELLINGTON and Assistant.

14. SPECIAL WORK IN PHYSIOLOGICAL AND ORGANIC AGRICULTURAL CHEMISTRY. — In this course, as in Courses 12 and 16, the student will be able to give his attention primarily to one line of chemical study. To those whose tastes and interests are in connection with the organic and physiological problems of agricultural chemistry, many subjects of study present themselves, among which may be mentioned: proteins, carbohydrates, fats, organic nitrogenous compounds in fertilizers and soils and their relation to plants, the commercial production of alcohol from agricultural products, digestion and dietary studies, etc. Prerequisites, Courses 5, 6 and 13. Seniors; laboratory, 10 hours. Credit, 5.

Associate Professor CHAMBERLAIN and Mr. FOWLER.

16. SPECIAL WORK IN PHYSICAL CHEMISTRY. — The field of agricultural chemistry offers many problems that have been attacked through the methods of physical chemistry; such, for example, are the hydrolysis of salts and of minerals and the absorption of salts and fertilizers by soils. Each student will select one line of work and follow it through the course, repeating some of the original work. Prerequisite, Course 15. Laboratory, 10 hours. Credit, 5. Assistant Professor ANDERSON.

15. PHYSICAL CHEMISTRY. — A résumé of general chemistry from the viewpoint of physical chemistry and the application of physical chemistry to agricultural chemistry. Prerequisite, Course 9. Juniors and seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Assistant Professor ANDERSON.

18. HISTORY OF CHEMISTRY. — An exposition of the development of chemical knowledge from the earliest times to the present. Although the entire history will be included, the larger portion of it will receive only brief mention in order that the questions of vital interest in modern life and industry may be studied at more length. Particular attention will be given to the questions of plant and animal industry. Chemists are strongly advised to take this course. [Not given in 1912–13.] Seniors; lectures, 2 hours. Credit, 2. Professor WELLINGTON.

ENTOMOLOGY.

Professor FERNALD, Associate Professor CRAMPTON, Assistant Professor GATES, Mr. MARTIN, Mr. DAVIS.

Elective Courses.

1. GENERAL AND ECONOMIC ENTOMOLOGY. — Course 1 comprises a general introduction to the study of insects, including studies on their structure as applied to their identification; the principles of classification; a systematic examination of the different groups and of the most important economic insects of each group, including their life histories and habits, recognition of their work as shown in the collections, and methods for their control. The most important insecticides and their preparation and application are also treated. Students electing Course 1 are expected to take Course 2. Juniors; 3 lecture periods. Credit, 3. Professor FERNALD.

2. GENERAL AND ECONOMIC ENTOMOLOGY. — A continuation of Course 1, with laboratory and field work on methods of collecting, preserving and studying insects and their work. Juniors; 2 laboratory or field periods. Credit, 3. Professor FERNALD.

3. ADVANCED ENTOMOLOGY. — This course is subdivided, the time spent on the various subdivisions differing somewhat according to the particular needs of those taking it; and it is to a large degree given in the form of individual instruction, special attention being paid to the pests attacking the particular crops in which the student is most interested. The student may specialize in fruit pests, market-garden pests, greenhouse pests, field crop pests, etc., to a large extent, in accordance with his plans for future work.

A. Morphology. — Careful studies of the structure of insects belonging to each of the larger and more important orders, together with lectures on the subject, followed by the identification of insects of each of these groups and the study of the collections, to teach the use of the analytical tables and of structural characters in the determination of insects.

B. Histology. — Lectures on the internal anatomy and histology of the various organs, with particular reference to those affected by the various insecticides.

C. Insecticides and Apparatus. — Lectures on the chemistry, preparation and application of the different insecticides, their merits and defects; tests for detecting adulterations; comparative tests of nozzles and other apparatus; and a study of other methods of insect control, together with laboratory work.

D. Coccidology. — Laboratory work on methods of preserving, mounting and identifying scale insects, particular attention being given to those of greatest economic importance.

E. Bibliography. — Studies of the various entomological publications and of the methods of finding the literature on any insect.

F. Special Studies. — In these studies the insects most closely related to the future occupation of the student will receive attention. The results of these studies are brought together in the form of an essay or thesis; this will include all the essentials of what is known of the life history, habits and injuries caused by each insect studied, together with methods of treatment, and a list of the best articles found in the course of the work. Comstock's "Manual for the Study of Insects" is used in the laboratory work. Seniors; prerequisite, Entomology 2; students electing Course 3 are expected to take Course 4; 1 1-hour lecture period and 3 2-hour laboratory or field periods. Credit, 4.

Professor FERNALD, Associate Professor CRAMPTON, Mr. MARTIN.

4. ADVANCED ENTOMOLOGY. — As stated in Course 3. Prerequisite, Course 3.

5. FOREST INSECTS. — A study of insects injurious to forest trees and of methods for their control, with laboratory and field work on these insects, and a study of what has been published about them. Seniors; prerequisites, Entomology 1 and 2; 1 lecture and 2 2-hour laboratory or field exercises. Credit, 3. Professor FERNALD.

8. BEEKEEPING. — This course comprises a general consideration of the biology of the honey bee and of practical beekeeping. Some topics covered are: phylogeny, life history, general behavior and instincts, structure, products, relations of bees to plants and the honey flora. The course aims particularly to afford first-hand, practical experience with bees, to the end of enabling their proper maintenance for any purpose, horticultural, educational or apicultural. Bee diseases, a thorough understanding of which is fundamental to the industry, are considered. So far as possible the work is made individual in constructing materials and apparatus. Juniors; seniors may elect. Courses 1 and 2 form a desirable preparation; 2 lectures; 1 2-hour laboratory period. Credit, 3.

Assistant Professor GATES, Mr. DAVIS.

[10.[1] ADVANCED BEEKEEPING. — This course deals with the advanced and special problems of the beekeeper. Besides considering those difficulties which at present confront the industry, subjects necessarily of limited treatment in the previous course are expanded for the development of particular technique and manipulation. Apiary management and the principles of queen rearing are practiced in accord with the season. The course should further qualify for apicultural instruction, inspection service, and afford familiarity with the special literature and method needed in investigation and research. The policy of individual instruction will be contained in so far as practicable. Primarily for seniors, but juniors may elect; prerequisite, Course 8; 1 lecture, 1 laboratory period. Credit, 2. Assistant Professor GATES.]

---

[1] The announcement of this course is made provisionally.

MATHEMATICS AND CIVIL ENGINEERING.

Professor OSTRANDER, Mr. DUNCAN, Mr. MACHMER, Mr. PARSONS.

Required Courses.

1. HIGHER ALGEBRA. — A brief review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Reitz and Crathorne's "College Algebra." Freshmen; 3 hours a week. Credit, 3. Mr. MACHMER and Mr. PARSONS.

2. HIGHER ALGEBRA. — As stated under Course 1. Mr. MACHMER.

3. SOLID GEOMETRY. — Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Wentworth and Smith's "Solid Geometry." Freshmen; required unless accepted for admission; 2 hours a week. Credit, 2. Mr. DUNCAN.

4. PLANE TRIGONOMETRY (in Charge of Department of Physics). — The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry." Required unless accepted for admission. Freshmen; 3 hours. Credit, 3. Professor HASBROUCK and Captain MARTIN.

Elective Courses.

6. PLANE SURVEYING. — The elements of the subject, including the adjustment and use of the usual instruments. Text-book and lectures. Sophomores; 6 hours a week. Credit, 3. Mr. DUNCAN and Mr. PARSONS.

7. ANALYTIC GEOMETRY. — A discussion of the geometry of the line, the circle, of conic sections and of the higher plane curves. Fine and Thompson's "Coördinate Geometry." Prerequisites, Mathematics 1, 2, 3 and 4. Primarily for juniors; 3 hours a week. Credit, 3. Professor OSTRANDER.

8. DIFFERENTIAL AND INTEGRAL CALCULUS. — A first course in the subject, with some of the more important applications. Nichol's "Differential and Integral Calculus." Prerequisites, Mathematics 1, 2, 3, 4 and 7. Primarily for juniors; 5 hours. Credit, 5. Professor OSTRANDER.

10. Advanced Surveying. — Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. [Not given in 1912–13.] Text-book and lectures; 6 hours. Credit, 5.
Professor Ostrander.

11. Hydraulics and Sanitary Engineering. — Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. [Not given in 1912–13.] Text-book and lectures; 3 hours. Credit, 3. Professor Ostrander.

12. Elementary Structures. — An elementary course in roofs and bridges. Text-book and lectures; 6 hours. [Not given in 1913–14.] Credit, 5. Professor Ostrander.

13. Materials of Construction, Foundations and Masonry Construction. — Text-book and lectures; 4 hours. [Not given in 1913–14.] Credit, 3. Professor Ostrander.

15. Applied Mechanics. — A course in applied mechanics, based on the calculus, with problems. Text-books and lectures. Prerequisites, Mathematics 7, 10; 3 hours. Credit, 3. Professor Ostrander.

MICROBIOLOGY.

Professor Marshall.

[The program of courses in the recently established department of microbiology has not been completed. Work will be outlined in pathology, bacteriology, etc., but only the course in dairy bacteriology (Dairying 3) has yet been offered.]

3. Dairy Bacteriology. — A study of bacteriology relative to market milk and dairy work. Prerequisites, Courses 1 and 2, and Bacteriology 1 (see Veterinary science); 3 2-hour laboratory periods. Credit, 3.
Professor Marshall.

PHYSICS.

Professor Hasbrouck, Captain Martin, Mr. Butman.

[The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry, zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.]

Required Course.

1. General Physics. — General physics covers mechanics of solids, mechanics of fluids, wave motion and heat. These topics are chosen for the required work because they are regarded as the most fundamental of all, and there is no part of the work in physics more necessary for the student who plans to take up practical farming. Course given by text-book and lectures. Sophomores; 4 hours' class-room work and 1 laboratory period. Credit, 5. Professor Hasbrouck and Mr. Butman.

Elective Courses.

2. General Physics. — Electricity and light. Text-book, lectures, recitations and laboratory work. Sophomores; 2 hours of class-room work and 1 laboratory period. Credit, 3. Mr. Butman.

3. Optical Instruments and Light. — Three-hour lecture course open to juniors and seniors; 3 hours. Credit, 3. Mr. Butman.

4. Electricity and Heat. — Three-hour lecture and laboratory course open to juniors and seniors; 3 hours. Credit, 3. Mr. Butman.

[Mathematics 4 (trigonometry) is, for convenience of grouping, listed under Mathematics, although in charge of the Department of Physics.]

VETERINARY SCIENCE.

Professor Paige, Assistant Professor Gage.

[The courses in veterinary science have been arranged to meet the needs of students who purpose following practical agriculture, and of prospective students of human and comparative medicine.]

Elective Courses.[1]

1. Introductory Bacteriology. — The object of this course is to acquaint the student with the various organisms found in air, water, soil, milk and the body, and with the relation of these organisms to such processes as decomposition, fermentation and digestion, and to the production of disease. Toxic substances resulting from the growth of organisms, and the antitoxins used to counteract their action, are considered. Lectures, recitations and laboratory work. Seniors; 3 2-hour laboratory exercises. Credit, 3. Professor Paige and Assistant Professor Gage.

2. Bacteriology. — A continuation of Course 1, taking up more advanced problems.

3. Veterinary Science. — A course treating of veterinary hygiene, comparative anatomy and general pathology; veterinary materia medica and therapeutics; the theory and practice of veterinary medicine; general, special and operative surgery; and veterinary bacteriology and parasitology. Lectures, clinics, demonstrations and laboratory exercises. Must be followed by Course 4. Seniors; 5 hours. Credit, 5. Professor Paige.

4. Veterinary Science. — As stated under Course 3.

---

[1] Revision of the plan of courses, to be in effect in 1913–14, is announced.

ZOÖLOGY AND GEOLOGY.

Associate Professor GORDON, Mr. PARKER.

ZOÖLOGY.

Required Course.

1. ANIMAL MORPHOLOGY. — This course presents the underlying principles of biology and the zoölogical part of an introductory course. Laboratory dissection and lectures. Sophomores; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3. Associate Professor GORDON.

Elective Courses.

3. COMPARATIVE INVERTEBRATE OR VERTEBRATE ZOÖLOGY. — These are parallel courses running throughout the year and are scheduled for the same hour. The student may elect one or the other, but not both in the same year. Comparative invertebrate zoölogy is intended primarily for future students in entomology, but is open to any one. Vertebrate zoölogy presents the comparative morphology of vertebrate forms. Parker & Haswell's "Text-book of Zoölogy," Vol. I., is required for invertebrate zoölogy, and Vol. II. for vertebrate zoölogy. Primarily for juniors; prerequisite for these courses, Course 1, or its equivalent; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3. Associate Professor GORDON.

4. COMPARATIVE INVERTEBRATE OR VERTEBRATE ZOÖLOGY. — Continuation of Course 3. One lecture hour and 2 2-hour laboratory periods. Credit, 3. Associate Professor GORDON.

5. ADVANCED ZOÖLOGY.[1] — A course in animal parasites is offered to seniors. This course is a survey of this special field, with laboratory dissection, lecture work and outside reading. Not open to fewer than three students. Prerequisites, Course 1 and Course 3 in comparative invertebrate zoölogy; 2 1-hour periods, or their equivalent and 3 2-hour periods. Credit, 5. Associate Professor GORDON.

6. ADVANCED ZOÖLOGY.[1] — Course 5, continued. One 1-hour period and 2 2-hour periods. Credit, 3. Associate Professor GORDON.

GRADUATE COURSES. — See "Graduate School."

GEOLOGY.

Elective Course.

2. ELEMENTARY GEOLOGY. — Rock-forming minerals; rock types; rock weathering; dynamical, structural and surface geology. Lectures, map and field work. Sophomores; 1 1-hour period and 2 2-hour periods. Credit, 3. Associate Professor GORDON.

---

[1] Courses 5 and 6 are also available as a minor for the degrees of master of science or doctor of philosophy.

DIVISION OF THE HUMANITIES.

Professor SPRAGUE.

ECONOMICS AND SOCIOLOGY.

Professor SPRAGUE.

Required Course.

1. POLITICAL ECONOMY. — An introductory course. A study of the nature and scope of economics; the evolution and organization of the present economic system, the principles of production, exchange and consumption. This course will take up such topics as value, rentals, population, labor and its problems, capital, interest and profits, systems and factors of production, tariffs and commerce. Students will be called upon to analyze industrial plants in actual operation. Text-books, lectures and general discussions; a required course, but it may be taken in either junior or senior year; 3 hours. Credit, 3. Professor SPRAGUE.

Elective Courses.

2. INDUSTRIAL PROBLEMS. — A course in the most important industrial problems of the day, covering the methods of organizations of labor and capital, systems of industrial remuneration, means of securing industrial peace, legal status of labor unions and their activities, protective legislation for workmen and employers, the problems of immigration, the sweated industries, prison labor, child labor and industrial education. Text-book, with collateral readings, lectures and discussions; 3 hours. Credit, 3. Professor SPRAGUE.

3. SOCIAL INSTITUTIONS AND SOCIAL PROBLEMS. — This course is devoted to the study of the social institutions, such as the family, the church, State and property; and to such current social problems as divorces, race suicide, crime and prison reform, poverty and its relief, social effects of low wages, child labor, overwork, immigration and congestion of population. The later weeks of the semester will be given to a short introduction to sociological theory. The correctional and charitable institutions of Massachusetts will be studied in considerable detail. Readings, lectures, papers; 3 hours. Credit, 3. Professor SPRAGUE.

4. MODERN SOCIAL REFORM MOVEMENTS. — The history of property and its vital issues in modern times. The socialistic systems, anarchy and communism. Systems of workingmen's insurance in Europe and America, and other methods of relief from the chances of life. Educational reforms, in process, to meet the demands of a new age, and legislative remedies for the evils of social change and maladjustment. The crisis of Christianity under modern capitalized industrialism. These topics indicate the nature of the subjects studied. This course follows Economics 3. Three hours. Credit, 3. Professor SPRAGUE.

5. PUBLIC FINANCE, MONEY AND BANKING. — This course follows Economics 1. It will take up taxation and the various systems for collecting public revenue in Europe and America, with the problems involved; the history of money and the systems of banking and finance now in operation; the causes and problems of economic crises and depressions; the currency problems of the United States. Readings, lectures and discussions; 3 hours. Credit, 3. Professor SPRAGUE.

6. ECONOMIC HISTORY. — This course will be divided between the economic history of Europe and that of America. An outline history will be followed with special study of selected epochal periods and important topics. Three hours. Credit, 3. Professor SPRAGUE.

8. ANTHROPOLOGY; THE HISTORY OF HUMAN CIVILIZATION. — The evolutionary origin and history of man; characteristics of primitive men, departure from the animal status, and the beginnings of civilization; development of industries, arts and sciences; the growth of languages, warfare, migrations and social institutions; a study of the powerful natural and human forces that have brought man from the early stages to modern conditions, will constitute the subject matter of the course. Three hours. Credit, 3. Professor SPRAGUE.

HISTORY AND GOVERNMENT.

Associate Professor EYERLY, Mr. HOLCOMB.

Elective Courses.

1. ELEMENTS OF POLITICAL SCIENCE. — Nature and scope of political science; origin and evolution of the State; systems of government in the principal European States; organization and working of the national and of the State governments of the United States; relation of government to political parties and to public opinion; the functions of government as related to labor and commerce. Three hours. Credit, 3.
Associate Professor EYERLY.

2. LOCAL POLITICAL INSTITUTIONS. — A comparative study of the organization, functions and achievements of country and city groups, especially as these are concerned with such matters as taxation, finance, licenses, franchises, public ownership, highways, transportation and communication, water supply, fire protection, public lighting, markets, food inspection, garbage and sewage disposal, infectious diseases, housing conditions, police force, parks and playgrounds, libraries, schools, care of dependents. Three hours. Credit, 3. Associate Professor EYERLY.

3. THE HISTORY OF NEW ENGLAND. — In this course, New England is regarded as a unit. Although the history of agriculture and rural life is treated with special fulness, ample attention is given to political, religious and ethical history. It is hoped that the student will not only be led to an intelligent understanding of present economic conditions, but will also be imbued with a progressive loyalty to the highest ideals of the New England of the past. Lectures and required reading; 3 hours. Credit, 3. Mr. HOLCOMB.

5. THE HISTORY OF IDEALS. — This course treats history from the idealistic rather than from the economic, point of view. It attempts to define the great ideals which have impelled some of the most important social, political, esthetic, scientific, ethical and religious movements of medieval and modern history, and to trace the causes of the success or failure of the movements to which these ideals have led. Christianity, including monasticism, modern Catholicism and Protestantism; medieval art and architecture; the modern scientific movement; and social and political democracy will be treated historically from this point of view. Lectures and reading; 3 hours. Credit, 3. Mr. HOLCOMB.

LANGUAGES AND LITERATURE.

Professor MILLS.

LANGUAGES AND LITERATURE: ENGLISH, JOURNALISM AND PUBLIC SPEAKING.

Associate Professor NEAL, Professor LEWIS, Assistant Professor SMITH, Mr. WATTLES, Mr. PRINCE, Miss GOESSMANN.

ENGLISH.

Required Courses.

1, 2. FRESHMAN ENGLISH. — Composition; introduction to literature. Recitations, laboratory practice and lectures; theme writing; conferences. Text-book and laboratory manual, Neal's "Thought-building in Composition." Freshmen; 4 hours. Credit, 4.

Associate Professor NEAL, Assistant Professor SMITH, Mr. WATTLES, Mr. PRINCE.

3, 4. SOPHOMORE ENGLISH. — Composition; literature. Prerequisite, Courses 2 and 3 respectively; sophomores; 2 hours. Credit, 2.

Professor LEWIS and Miss GOESSMANN.

Elective Courses in English Language and Literature.

7. EXPOSITORY WRITING. — The principles of exposition, with exercises in composition. Subjects will be largely found in current events and contemporary thought, and treated editorially. A foundation course in more advanced composition, primarily for juniors but open to seniors; advised for those who plan to take Course 8. First given in 1912–13. Two hours, with a third hour at the option of the instructor. Credit, 2.

Mr. WATTLES.

8. EXPOSITORY WRITING. — The principles of exposition with especial reference to technical writing, including the writing of bulletins; some attention also to the more popular exposition of scientific facts. Primarily for juniors but open to seniors. First offered in 1912–13. Two hours, with a third hour at the option of the instructor. Credit, 2.

Mr. WATTLES.

9, 10. CULTURAL READING. — Not given in 1912–13.

13. ENGLISH WRITERS AND THOUGHT. — Studies, laboratory problems, readings, and reports in some period of English literature. Three hours. Credit, 3. Assistant Professor SMITH.

14. ENGLISH WRITERS AND THOUGHT. — As in Course 13. Three hours. Credit, 3.

15. PROSE MASTERS OF THE NINETEENTH CENTURY. — A sympathetic study of the writings of Ruskin, Carlyle, Newman, Arnold and Stevenson. Junior and senior course; 3 hours. Credit, 3. Professor LEWIS.

16. POETS OF THE VICTORIAN AGE: BROWNING, TENNYSON AND ARNOLD. — This course will deal especially with the ethical and religious ideals of these poets as expressed in their most serious poems. Junior and senior course; 3 hours. Credit, 3. Professor LEWIS.

17. ADVANCED COMPOSITION AND LITERATURE. — The reading and study of writings that are typical of literary style or form, especially in description and narration, and the writing of exercises involving problems of the same general sort as those illustrated by the readings. A good deal of fiction will probably be read, of which more or less will be found in the novels and short stories of our own day. On this study will be based the work in composition. Primarily for seniors but open to juniors. Two hours, with a third hour at the option of the instructor. Credit, 2.
Associate Professor NEAL.

18. ADVANCED LITERATURE. — This course varies from year to year. It will usually provide opportunity either for intensive study of great writers or for study of the historical development or the structure and characteristics of literary types. Three hours. Credit, 3.
Associate Professor NEAL.

JOURNALISM.

[The courses in journalism emphasize rural journalism. They aim to acquaint the student with the elementary problems and theory of journalism as a profession or vocation, and to exercise him, as far as conditions permit, in the commoner aspects of journalistic work, such as news-gathering, news-writing, desk-editing and editorial writing. By rural journalism is meant the application of journalistic principles in getting and suitably presenting material adapted to the non-urban rather than to the urban or metropolitan reader, so far as their interests are distinct. This includes agricultural journalism, but is by no means confined to that. Members of the classes supply, under the head "The Bay State Ruralist," a feature page for the "Springfield Sunday Union." Members of all classes may be required to turn in copy regularly for such disposition as the instructor may determine, and must have free time for covering stories. Students wishing to proceed beyond elementary study are urged to consult with the instructor before making their election in other subjects for the junior-senior years, in order that the most helpful program of work may be arranged.]

Elective Courses.

1. INTRODUCTION TO JOURNALISM. — The foundation conceptions and aims of journalism; practice in the simple forms of journalistic writing. Prerequisite to all other work in journalism, and valuable also to students

preparing for practical farming, agricultural or general science, rural education, etc., as a vocation. Two hours, with a third hour at option of the instructor. Credit, 2.

Associate Professor NEAL, Assistant Professor SMITH.

2. REPORTING. — News-gathering and news-writing. This includes the gathering and presentation of industrial and agricultural information, campus news or other stories, as may be directed. Courses 1 and 2 are the foundation courses in journalism. Students admitted to 2 who have not had 1 will be required to do extra work. Two hours, with a third hour at the option of the instructor. Credit, 2.

Associate Professor NEAL.

3. JOURNALISTIC PRACTICE. — The gathering and preparation of material for publication. The class may be organized as a staff. Prerequisite, course 1 or its equivalent. Two hours, with a third hour at the option of the instructor. Credit, 2. Associate Professor NEAL.

4. JOURNALISTIC PRACTICE. — As stated under Course 3.

5. ADVANCED JOURNALISTIC PRACTICE. — Informal; students will be assigned work as editorial assistants or writers, or otherwise employed in some form of journalistic activity. Study of particular forms of journalistic writing, of special subjects and their journalistic presentation, of particular kinds of periodical, or of current topics may be directed, and the presentation of a thesis may be required. Hours to be arranged. Two hours. Credit, 1. Associate Professor NEAL.

6. ADVANCED JOURNALISTIC PRACTICE. — As stated under Course 5.

PUBLIC SPEAKING.

Required Courses.

1. FRESHMAN PUBLIC SPEAKING. — Freshman public speaking is required in either the first or the second semester at the option of the instructor. The course is concerned with the actual problems which confront the man who would speak convincingly and persuasively. Some attention is given to breath control and development of speaking voice, considerable attention to pronunciation and enunciation, and a large amount of attention to the preparation and delivery of extempore speeches. Text-book, Shurter's "Extempore Speaking," supplemented by lectures and discussions. Freshmen; 1 hour. Credit, 1. Mr. PRINCE.

2. FRESHMAN PUBLIC SPEAKING. — As stated under Course 1. Required of all freshmen who are not assigned to take Course 1.

8. OCCASIONAL ORATORY. — Exercises for voice and gesture; a study of the elements of vocal expression and action; speeches on assigned topics; prescribed reading; the preparation and delivery of a formal oration or two. It is especially recommended for those who desire to enter the Flint contest. Two hours. Credit, 2. Assistant Professor SMITH.

LANGUAGES AND LITERATURE: GERMAN.

Assistant Professor ASHLEY, Mr. JULIAN.

Required Courses.

1. ELEMENTARY GERMAN. — Grammar and composition; the reading of short stories, poems, plays, etc. Especial attention is given to oral questioning and answering in German, and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Mr. JULIAN.

2. ELEMENTARY GERMAN. — As stated under Course 1. Prerequisite, Course 1.

3. INTERMEDIATE GERMAN. — Rapid reading of selected works from Schiller, Goethe, Lessing and others; review of grammar and dictation in German; outside readings. Required of freshmen who present German for entrance and do not take French. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Assistant Professor ASHLEY.

3A. INTERMEDIATE GERMAN. — Rapid reading of prose works, such as Sudermann's "Frau Sorge," and dramas, such as "Wilhelm Tell" and "Die Journalisten." Required of sophomores who took Courses 1 and 2 as freshmen. Mr. JULIAN.

4. INTERMEDIATE GERMAN. — As stated under Course 3. Prerequisite, Course 3.

4A. INTERMEDIATE GERMAN. — As stated under Course 3A. Open to students who have completed German 3A; 3 hours. Credit, 3.

5. ADVANCED GERMAN. — Literary study of the classicists, — Schiller's "Wallenstein," Lessing's "Nathan der Weise," Goethe's "Iphigenia," etc.; collateral readings in German and class-room reports. Conducted in German. Prerequisite, Course 4. Sophomores; required of those who took German 3 and 4 as freshmen; open upon arrangement to other students; 3 hours. Credit, 3. Assistant Professor ASHLEY.

Elective Courses.

6. ADVANCED GERMAN. — As stated under Course 5. Sophomores; open upon arrangement to other students. Prerequisite, Course 5; 3 hours. Credit, 3. Assistant Professor ASHLEY.

7. MODERN GERMAN. — Reading of articles from the best modern German periodicals, such as "Ueber Land und Meer;" conversation and composition work based on text. "Ferien in Deutschland," prepared by instructor; 3 hours. Credit, 3. Assistant Professor ASHLEY.

8. MODERN GERMAN. — As stated under Course 7.

9. SCIENTIFIC GERMAN. — Reading of modern magazine articles and works in German of a scientific nature. Different work assigned according to needs of individual students. Open to juniors who have completed Course 4A or more advanced work. Three hours. Credit, 3.
Assistant Professor ASHLEY.

10. SCIENTIFIC GERMAN. — As stated under Course 9.

11. GERMAN LITERATURE. — Advanced language and literary study. Conducted entirely in German. Lectures on German literature and history; life, customs and travel in Germany. Collateral readings, including masterpieces of different epochs, such as "Niebelungenlied," Goethe's "Faust," and one modern typical drama. Prerequisite, Course 6 or 10.
Assistant Professor ASHLEY.

12. GERMAN LITERATURE. — As stated under Course 11.

LANGUAGES AND LITERATURE: FRENCH.

Assistant Professor MACKIMMIE, Mr. HARMOUNT.

1, 2. ELEMENTARY FRENCH. — The essentials of grammar are rapidly taught. Thieme and Effinger's "French Grammar" will be used during the first semester. A large amount of reading is required. Required of freshmen presenting German for entrance who do not continue that language and have not studied French; open upon arrangement to other students. Freshmen; 4 hours. Credit, 4. Mr. HARMOUNT.

3. INTERMEDIATE FRENCH (third year). — Training for rapid reading; the reading of a number of short stories, novels and plays; composition; reports on collateral reading from periodicals and scientific texts in the library. Required of freshmen who present two years of French for entrance and do not take German, and of sophomores who take Courses 1 and 2 as freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Assistant Professor MACKIMMIE, Mr. HARMOUNT.

4. INTERMEDIATE FRENCH. — As stated under Course 3, but not required of sophomores who take Courses 1 and 2 as freshmen. Prerequisite, Course 3. Assistant Professor MACKIMMIE.

5. ADVANCED FRENCH (fourth year). — A reading course; Balzac's "Eugenie Grandet" and "Le Père Goriot" and other masterpieces of the nineteenth century; Brunetière's "Honoré de Balzac" and Harper's "Masters of French Literature;" readings in the library and written reports. Required of sophomores who take Courses 3 and 4 as freshmen; open upon arrangement to other students. Prerequisite, Course 4; 3 hours. Credit, 3. Assistant Professor MACKIMMIE, Mr. HARMOUNT.

Elective Courses.

6. ADVANCED FRENCH (fourth year). — A general view of the history of French literature; Kastner and Atkins' "History of French Literature." Several plays of the great classical dramatists will be read. Individual

conferences on outside reading selected by the student. Prerequisite, Course 5. Sophomores; open upon arrangement to other students; 3 hours. Credit, 3. Assistant Professor MACKIMMIE.

7, 8. SCIENTIFIC FRENCH. — This course is planned to meet the requirements of the individual student and aims to equip him with exact English equivalents for the French scientific terms in his particular science. Word lists of scientific terms will be required and also weekly readings and reports from scientific works in the subject in which he is majoring. Several scientific readers will be read. Three hours. Credit, 3. Mr. HARMOUNT.

9, 10. MODERN FRENCH LITERATURE. — The outline is intended as a suggestion. The exact subject matter of the course will be determined when the men are enrolled. The object of this course is to give an introduction to recent movements in French literature. In the drama, readings from Augier, A. Dumas, fils, Delavigne; in the novel, from Flaubert, the de Goncourts, Zola; in criticism, from Taine, Renan, Sainte-Beuve; for the literary history of the period Lanson's "Histoire de la Litterature Française." Prerequisite, the required French. Juniors or seniors; 3 hours. Credit, 3. Assistant Professor MACKIMMIE.

LANGUAGES AND LITERATURE: SPANISH.

Assistant Professor MACKIMMIE.

Elective Courses.

1. ELEMENTARY SPANISH. — Grammar, with special drill in pronunciation; reading from a simple reader. Seniors or juniors; open upon arrangement to other students; 3 hours. Credit, 3.
Assistant Professor MACKIMMIE.

2. MODERN SPANISH AUTHORS. — Reading from modern Spanish novel and drama. Prerequisites, Course 1. Seniors or juniors; open upon arrangement to other students; 3 hours. Credit, 3.
Assistant Professor MACKIMMIE.

LANGUAGES AND LITERATURE: MUSIC.

Assistant Professor ASHLEY.

Elective Courses.

1. HISTORY AND INTERPRETATION OF MUSIC. — History of music among the ancients; medieval and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school — Bach, Händel, Haydn, Gluck and Mozart. One hour. Credit, 1. Assistant Professor ASHLEY.

2. HISTORY AND INTERPRETATION OF MUSIC. — A continuation of Course 1. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera. The Modern school and Modern composers. One hour. Credit, 1.
Assistant Professor ASHLEY.

DIVISION OF RURAL SOCIAL SCIENCE.

President Butterfield.

AGRICULTURAL ECONOMICS.

Associate Professor Cance.

Required Courses.

2. Agricultural Industry and Resources. — A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions. Sophomores; 3 hours. Credit, 3. Associate Professor Cance.

Elective Courses.

4. Elements of Agricultural Economics. — This course is designed to follow the required work in the elements of economics. It will consider the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; determination of price; speculation; problems of land tenure and land values; taxation of land values; the maintenance of the economic status of the farmer; and the relation of the farmer to the State. Lectures, text, readings, topics and field work; 3 hours. Credit, 3. Associate Professor Cance.

5. Historical and Comparative Agriculture. — Recommended to students in journalism or education. A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on present conditions and the history of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Seniors and juniors; open to other students upon arrangement; prerequisite, Course 4 or equivalent; 3 hours. Credit, 3. Associate Professor Cance.

6. Co-operation in Agriculture. — The course contemplates a somewhat comprehensive view of the history, principles and business relations of agricultural organization for profit. (1) A survey of the development and progress, the methods and economic results, of the farmers' organizations and great co-operative movements in the past; (2) the phases of business organization of agriculture abroad, and the present aspects and

tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers, and practical working plans for co-operative associations, with particular reference to the marketing of perishable products. Lectures, text, assigned reading and practical exercises; 2 or 3 hours. Credit, 2 or 3. Associate Professor CANCE.

7. PROBLEMS IN AGRICULTURAL ECONOMICS. — An advanced course for students desirous of studying more intensively some of the problems immediately affecting the welfare of the farmer and society. Some of the problems that may be studied are: land problems, — land tenure, size of farms, causes affecting land values, private property in land, taxation of farm values, special problems, — cost of producing farm products, farm labor in New England, immigration, shifting of the rural population. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest. Seniors and juniors; open upon arrangement to other students; enrollment subject to approval of instructor; 2 or 3 hours a week. Credit, 2 or 3.
Associate Professor CANCE.

8. THE AGRICULTURAL MARKET. — This course contemplates a study of the forces and conditions which determine the prices of farm products, and the mechanism, methods and problems concerned with transporting, storing and distributing them. Such topics as supply and demand, course of prices, transportation by freight, express and trolley, terminal facilities, the middleman system, speculation in agricultural products, protective legislation, the retail market, direct sales and the like will be taken up. The characteristics and possibilities of the New England market will be given special attention. Lectures, readings, assigned studies and field work. [Not offered in 1913–14.] Juniors and seniors; 2 or 3 hours a week. Credit, 2 or 3. Associate Professor CANCE.

9. SEMINAR. — Research in agricultural economics and history: New England agriculture to 1860. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged. Credit, 1.
Associate Professor CANCE.

10. SEMINAR. — As stated in Course 9.

AGRICULTURAL EDUCATION.

Professor HART, Associate Professor MORTON.

Elective Courses.

1. MEANING OF EDUCATION (PSYCHOLOGY). — A study of the development, structure and function of the nervous system with reference to the sense organs; relation of mind to the nervous system; growth and nature of mental processes; the activities of the mind in the process of learning. Text-book, lectures, discussion, and collateral readings and reports; 3 hours. Credit, 3. Professor HART.

2. Vocational Education (History and Philosophy). — A survey of educational, religious and social movements with reference to their vocational aspects; the growth of educational institutions as influenced by science and industry. Lectures, collateral readings, reports, and a thesis on some phase of industrial education; 3 hours. Credit, 3.
Professor Hart.

3. Rural School Problems. — A study of agricultural education; the theory and practice of teaching; school organization and methods of instruction; the place and function of agriculture in the course of study. Primarily for those who have had Course 1 or 2; 2 hours. Credit, 2.
Professor Hart.

4. Rural School Problems. — Designed primarily for those who intend to teach; may be taken in connection with Course 3. The work consists of the selection and review of such parts of the courses in agriculture, horticulture and the biological and physical sciences as are adapted to the work of the public schools; planning, and practical work in school gardens; decoration of school grounds; equipment and conduct of playgrounds. One lecture period, 2 two-hour laboratory periods. Credit, 3.
Professor Hart, Associate Professor Morton.

5. Seminar in Education. — For students who have had courses 1, 2 and 3, or an equivalent. Topics that may be taken up for rather exhaustive study are: rural school supervision, and rural school surveys, and secondary school agriculture. Seniors and graduate students; 2 hours. Credit, 2.
Professor Hart.

6. Seminar in Education. — As stated under Course 5.

RURAL SOCIOLOGY.

Associate Professor Eyerly, President Butterfield, Professor Hart, Mr. Holcomb.

Elective Courses.

2. The Rural Community. — A broad survey of the field of rural sociology, including such topics as the movements of the rural population, the social conditions and life of rural people, the influence of rural life, the description of the various social institutions of the rural community, an analysis of the fundamental problems of rural life, and the means of developing and redirecting the life of the rural community. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3.
President Butterfield and Associate Professor Eyerly.

3. The Literature of Rural Life. — A critical and appreciative study of writers, both in prose and poetry, who have interpreted nature from the viewpoint of the lover of country life, and those who have idealized agriculture, horticulture and other rural pursuits, together with those who have upheld as an ideal the development of a rural environment in cities; 3 hours. Credit, 3.
Mr. Holcomb.

4. Rural Law. — The work of this course will cover such points as land titles, public roads, rights incident to ownership of live stock, contracts, commercial paper and distinctions between personal and real property. Text, written exercises, lectures, and class discussions; 1 hour. Credit, 1. Professor Hart.

5. The Social Conditions of the Rural People. — Composition of the rural population; vital statistics; nature, extent and causes of diseases and accidents; health agencies of control; extent and causes of delinquency and dependency; conditions of temperance, of sexual morality and family integrity; child labor; woman's work and position; relation of employer to employee; standard of living; size of family; cultural ideals; community consciousness and activity; standards of business conduct and of political ethics; 3 hours. Credit, 3. Associate Professor Eyerly.

6. Sociological Aspects of Co-operation among Farmers. — An historical sketch of the origin, extent and success of co-operation among farmers in the various European countries and in the United States; personal qualities and social conditions necessary to successful co-operative endeavor; the various forms of co-operative organization viewed in their industrial, intellectual and moral aspects; the influence of co-operation on the farmer's individualism, conservatism, self-help, thrift, contentment and on agrarian legislation, scientific agriculture and farm labor; the relation of co-operation to neighborhood life, to community pride and loyalty, to further associated effort, to class stability, solidarity and status; the demand of co-operation for a new type of leadership; the relation of co-operation to socialism and the competitive system; 3 hours. Credit, 3. [Given in 1912–13; not given in 1913–14.]

Associate Professor Eyerly.

7. Rural Institutions. — A study of the organized agencies by which rural communities carry on their various forms of associated life; particularly a study of the ways by which the domestic, economic, cultural, religious and political institutions contribute to rural betterment. Special attention given to the rural family and the rural church; 3 hours. Credit, 3. Associate Professor Eyerly.

8. The State and the Farmer. — A general survey of political organizations and movements among farmers in foreign countries and their influence in shaping agrarian legislation; the character, extent and results of foreign State aid to the farming class; political movements among farmers in the United States; "Granger" legislation; relation of the Department of Agriculture, State boards of agriculture, agricultural colleges and experiment stations, postal system, railway commissions, highway commissions, public health agencies, etc., to rural welfare; 3 hours. Credit, 3. Associate Professor Eyerly.

9. The Social Psychology of Rural Life. — Characteristics of the rural mind; character of hereditary and environmental influences; nature and effects of face-to-face groups; psychological effects of isolation, rela-

tive security and freedom from strain; relation of contact with nature, of control over immediate environment, of family co-operation and of neighborhood life to self-control, self-expression, sympathy, service and leadership; nature and effects of fashion, conventionality and custom; character of discussion and public opinion, and their relation to class feeling and organization; relation of individualism, conservatism and homogeneity to crowd phenomena and progressive democracy; 3 hours. Credit, 3.
Associate Professor EYERLY.

10. FARMERS' ORGANIZATIONS. — The history, purposes and achievements of the Grange, the Farmers' Union, farmers' clubs, village improvement associations, boys' clubs, etc.; the nature, scope, methods and history of local, State and national associations formed about some farm product or special farm interest, *e.g.*, dairying, horticulture, stock breeding, forestry; their influence on "better farming, better business, better living;" their influence in forming a class consciousness and in shaping legislation; need of federation; 3 hours. Credit, 3. Associate Professor EYERLY.

11. SOCIOLOGICAL ASPECTS OF CURRENT AGRICULTURAL QUESTIONS. — Government conservation policy, roads, railways, trolleys, telephones, postal service, credit facilities, taxation, pure food laws, tenancy and ownership, intensive versus extensive farming, agricultural labor; 3 hours. Credit, 3.
Associate Professor EYERLY.

13. SEMINAR. Associate Professor EYERLY.

GENERAL DEPARTMENTS.

MILITARY SCIENCE AND TACTICS.

Captain MARTIN, Mr. PARSONS.

[The Department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-years course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the practical (drill) courses in Military Science are given up to the Christmas recess and from the close of the spring recess to the end of the semester each year; the corresponding courses in Physical Education occupy the intervening time.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

The required uniform is of khaki, costing about $15. It is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $15 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited, unless the consent of the military instructor be obtained.]

Required Courses.

1. FRESHMAN DRILL. — Practical instruction in infantry drill regulations through the school of the battalion in close and extended order; advance and rear guards; outposts; marches; ceremonies; guard duty. Upon the conduct and proficiency of this year depends the appointment of corporals for the ensuing year. Freshmen; first semester until Christmas recess; 3 hours. Credit, 1. Captain MARTIN, Mr. PARSONS.

2. FRESHMAN DRILL. — As stated under Course 1. Freshmen; second semester after spring recess; 3 hours. Credit, 1.

3. SOPHOMORE DRILL. — Practical instruction as before; pointing, aiming and sighting drills; litter drills, and first aid to the injured by detachment; target practice, in gallery and on the range. Corporals are appointed from this class. On their conduct and proficiency depends the appointment of sergeants in the next class. Sophomores; first semester until Christmas recess; 3 hours. Credit, 1. Captain MARTIN, Mr. PARSONS.

4. SOPHOMORE DRILL. — As stated under Course 3. Sophomores; second semester after spring recess; 3 hours. Credit, 1.

5. SOPHOMORE TACTICS. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the company, "Manual of Guard Duty," "Small Arms Firing Regulations." Sophomores; 1 hour. Credit, 1. Captain MARTIN.

6. SOPHOMORE TACTICS. — As stated under Course 5. Sophomores; 1 hour. Credit, 1.

7. JUNIOR DRILL. — Practical instruction as before, target practice, in gallery and on the range. Sergeants are appointed from this class. On their conduct and proficiency depends their selection as officers for the ensuing year. When necessary, officers will also be appointed from this class. Juniors; first semester until Christmas recess; 3 hours. Credit, 1. Captain MARTIN, Mr. PARSONS.

8. JUNIOR DRILL. — As stated under Course 7. Juniors; second semester after spring recess; 3 hours. Credit, 1.

9. JUNIOR TACTICS. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the battalion; advance and rear guards; outposts; marches and ceremonies; "Manual of Field Service Regulations;" preparation of reports; returns, muster-rolls, enlistment and discharge papers, rosters, requisitions, etc.; army regulations; lectures on military science. Juniors; 1 hour. Credit, 1. Captain MARTIN.

10. JUNIOR TACTICS. — As stated under Course 9. Juniors; 1 hour. Credit, 1.

Elective Courses.

11. SENIOR DRILL. — Practical instruction as before; conduct of drills of lower classes. Officers will as a rule be selected from this class. Cadets electing Courses 11 and 12 must take the election for the year, and not later than the first Monday in June of their junior year. No cadet electing this course will after the commencement drill be permitted to change his election without the consent of the dean of the faculty and of the commandant. Seniors; first semester until Christmas recess; 3 hours. Credit, 1. Captain MARTIN.

12. SENIOR DRILL. — As stated under Course 11. Seniors; second semester after spring recess; 3 hours. Credit, 1.

PHYSICAL EDUCATION AND HYGIENE.

Assistant Professor HICKS, Mr. FITZMAURICE.

HYGIENE.

Required Courses.

1. HYGIENE. — Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation. Freshmen; 1 hour. Credit, 1.
Assistant Professor HICKS.

PHYSICAL EDUCATION.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in Military Science. All classified undergraduate students are given a physical examination upon entering.]

Required Courses.

1. ELEMENTARY GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 2. Freshmen; 3 hours. Credit (given only for Course 2), 1.
Assistant Professor HICKS and Mr. FITZMAURICE.

2. ELEMENTARY GYMNASTICS. — As stated under Course 1.

3. GRADED GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 4. Sophomores; 3 hours. Credit (given only for Course 4), 1.
Assistant Professor HICKS and Mr. FITZMAURICE.

4. GRADED GYMNASTICS. — As stated under Course 3.

5. GYMNASTICS. — Drills, games and athletics; from January 1 to April 1, in connection with Course 6. Juniors; 3 hours. Credit (given only for Course 6), 1. Assistant Professor HICKS and Mr. FITZMAURICE.

6. GYMNASTICS. — As stated under Course 5.

Elective Courses.

7. TRAINING COURSE. — Leadership class and squad work; supervision of indoor and outdoor athletic contests and games; boxing and wrestling. Seniors; 3 hours. Credit, 1. Assistant Professor HICKS.

8. TRAINING COURSE. — As stated under Course 7.

THE GRADUATE SCHOOL.

THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., LL.D., President of the College.

CHARLES E. MARSHALL, Ph.D., Director of the Graduate School and Professor of Microbiology.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years. Demands for these courses have now greatly increased, and in recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station agriculturists, bacteriologists, botanists, chemists, entomologists, horticulturists and zoölogists; and for numerous other positions requiring a great degree of skill and scientific knowledge.

ADMISSION.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the professor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for membership to the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, — together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

Nature and Methods of Graduate Work.

Persons taking graduate work will find this quite different in its nature from undergraduate courses. A broad knowledge of two (or three) subjects is required, and the professors in charge of these may adopt any methods which may seem desirable to secure this to the student. Lectures, laboratory and field work in various forms are utilized; but whatever the method chosen, the aim is to train the students in methods of original investigation and experiment, inductive reasoning and the ability to carry on independent research. In addition to the lectures, a large amount of outside reading is required, the object being to give a broad knowledge of all aspects of the subjects chosen, in addition to the complete knowledge of those portions involved in or directly related to the original investigation which is to result in the thesis. Originality and ability to lead in scientific research after completing graduate work, and the establishment of a broad and thorough foundation upon which these qualities must be based, are the objects aimed at; and any methods which promise to give these results may be made use of (varying according to the nature and personal equation of each student), the supervision being largely individual rather than collective.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as the major and the other as the minor. These subjects may not be selected in the same department.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major, the others as minors. No two of these subjects may be taken in the same department.

Advanced students who are not candidates for degrees may, with the approval of the faculty of the school, take more than one subject in the same department.

A statement of the subjects chosen must in each case be submitted to the director of the school for approval by the necessary committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

A description of the equipment of the various departments is given under "General Information."

Theses.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject, must show that its writer possesses the ability to carry on original research, and must be an actual contribution to knowledge.

Two copies of each thesis in its final form, ready for the printer, must be submitted to the director of the school before the candidate for the degree may take the required oral examination. One of the said copies, to contain all drawings, is to be retained as an official copy by the said director, and the other by the department in which the thesis was prepared. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis. When printed, three copies of each thesis must be deposited with the director of the graduate school and three copies with the department in which the work was carried out.

All theses become the property of the department in which they are prepared.

FINAL EXAMINATIONS.

For the degree of master of science, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degree of doctor of philosophy, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

DEGREES CONFERRED.

The degree of master of science is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.
2. The devotion of twenty hours each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.
3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.
4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.
5. The payment of all fees and college expenses required.

The degree of doctor of philosophy is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.
2. The devotion of twenty hours each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.
3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.
4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the professors in charge.
5. The payment of all fees and college expenses required.

The fee for the degree of master of science is $10, and for the degree of doctor of philosophy, $25.

COURSES FOR DEGREE OF MASTER OF SCIENCE.

Available either as major or minor subjects for the degree of master of science: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Mathematics and physics.
Veterinary science.
Zoölogy (minor only).

COURSES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

Available for a major subject for the degree of doctor of philosophy: —

Botany.
Chemistry.
Entomology.
Horticulture.

Available for a minor subject for the degree of doctor of philosophy: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Zoölogy.

GENERAL OUTLINE OF COURSES FOR THE DOCTORATE.

Major Courses.

BOTANY. — The following subjects in botany may be studied: —

(*a*) Vegetable physiology.
(*b*) Vegetable pathology.
(*c*) Mycology.
(*d*) Ecology.
(*e*) Taxonomy.
(*f*) Phylogeny.
(*g*) History of Botany.
(*h*) History and theory of evolution.

These subjects are pursued, to a greater or less extent, as the previous training of the student and the nature of the original problem undertaken may determine. The object of the course is to give the student a technical training in botany, to develop the spirit of research and to lay a broad foundation in the subject. (As a supplement to this course the student will do well to take, in addition to his prescribed minor work, a brief course in the history of philosophy and psychology.) Extensive reading of botanical literature, both general and specific, is required in certain subjects, and occasional lectures are given. A botanical conference is held monthly, in which various new problems of botanical science are considered by graduate students and the seniors who elect botany. A thesis dealing with some economic problem in plant physiology or pathology, or in both, and containing a distinct contribution to knowledge, is required.

CHEMISTRY. — The department is prepared to offer advanced courses in the following branches of chemistry, particularly as applied to agriculture: —

(*a*) Inorganic chemistry.
(*b*) Organic chemistry.
(*c*) Physiological chemistry.
(*d*) Physical chemistry.
(*e*) Analytical chemistry.

Here follows a statement of courses which may be selected by any one properly qualified, and particularly by those who are desirous of doing work for advanced degrees: —

Course A. Research in industrial problems applied to agriculture.
Associate Professor PETERS.

Course B. Research in physico-agricultural chemistry. Prerequisite, Course 15 or its equivalent. Assistant Professor ANDERSON.

Course C. Advanced analytical chemistry. Research work in connection with the study of methods of analysis of fertilizers, cattle feeds, dairy products, soils, insecticides and sugars. Recent and original methods will be applied to a study of the composition of agricultural products. Professor WELLINGTON.

Course D. Advanced organic chemistry. Special topics in advanced organic chemistry will be considered, both by lectures and in the laboratory. These will include such subjects as constitution and properties of carbohydrates, proteins and fats, uric acid and related compounds, and alkaloids; also such purely chemical phenomena as isomerism, tautomerism and optical rotation. The reading will include "The Monographs on Biochemistry," Cohen, Schorlemmer and Lachman. Associate Professor CHAMBERLAIN.

Course E. Advanced topics in physiological agricultural chemistry will be studied especially in the laboratory, including digestion, metabolism and nutrition, dietetics, feeding rations, enzymatic action and isolation of enzymes. Required reading will be followed in Abderhalden, Lusk, Hammersten, Stiles, Armsby and Euhler. Associate Professor CHAMBERLAIN.

Students for the advanced degrees of master of science and doctor of philosophy will be given a special outline of work, and will also be assigned a subject for an original thesis by the professor in charge of the work, all of which must be completed to the satisfaction of the chemical staff and particularly of the professor under whom the work is done. Students not working for a degree may take special work along agricultural chemical lines. Information may be obtained by consulting the chemical staff.

ENTOMOLOGY. — I. For the degree of doctor of philosophy as a major: Some knowledge of all the divisions of this subject is essential for the professional entomologist, though a large part of his time will be devoted only to certain portions. To insure some familiarity with all these divisions, lectures, laboratory work, field training or required reading are given in each of the following topics: —

(*a*) *Morphology.* — Embryology; life history and transformations; histology; phylogeny and the relation of insects to other arthropods; hermaphroditism; hybrids; parthenogenesis; pedogenesis; heterogeny; chemistry of colors of insects; luminosity; deformities of insects; variation; duration of life.

(*b*) *Ecology.* — Dimorphism; polymorphism; warning coloration; mimicry; insect architecture; fertilization of plants by insects; instincts of insects; insect products of value to man; geographical distribution in the different faunal regions; methods of distribution; insect migration; geological history of insects; insects as disseminators of disease; enemies of insects, vegetable and animal, including parasites.

(*c*) *Economic Entomology.* — General principles; insecticides; apparatus; special cases; photographs of insects and their work; methods of drawing for illustrations; field work on insects and study of life histories; legislation concerning insects.

(*d*) *Systematic Entomology.* — History of entomology, including classifications and the principles of classification; laws governing nomenclature; literature, how to find and use it; indexing literature; number of insects in collections and in existence (estimated); lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections of insects.

(*e*) *Seminar.* — A monthly meeting of graduates, at which reports on current literature are presented and various entomological topics of importance are discussed.

(*f*) *Required Readings.* — The best article on the various topics named above and on the different orders of insects, to cover from fifteen thousand to twenty thousand pages of English, French and German, the candidate to be examined at the close of his course on this with his other work.

(*g*) *Thesis.* — A thesis, illustrated with drawings, consisting of the results of original investigation upon one or several topics, and constituting a distinct contribution to knowledge, must be completed before the final examinations are taken.

II. For the degree of doctor of philosophy as a minor, and for the degree of master of science either as a major or minor: Such portions of the course outlined above as seem most appropriate to their other subjects are given to students taking entomology as a minor.

HORTICULTURE. — Graduate work is offered in various lines of horticulture. For the most part this is divided into the different departments which now constitute the college Division of Horticulture, and which are as follows: Pomology, Floriculture, Landscape Gardening, Forestry and Market Gardening. For work in these lines application should be made direct to the heads of the several departments.

Besides this work, however, opportunity is offered for graduate study in General Horticulture, including topics from the several organized departments mentioned, and also questions relating to plant breeding, general evolution, propagation, manufacture of horticultural products, etc. This general work is under the direction of Prof. F. A. Waugh, head of the Division of Horticulture.

ZOÖLOGY. — Courses in zoölogy are available as a minor for the degree of master of science, and as a minor for the degree of doctor of philosophy. The nature of the work varies according to circumstances, and may be intensive in a special field, or of a somewhat more general character, depending on the student's previous acquaintance with general zoölogical science.

The time devoted to zoölogy as a minor for either of the above-named degrees may vary from 12 to 16 hours per week, pursued for a year and a half.

THE SHORT COURSES

AND

THE EXTENSION SERVICE.

THE SHORT COURSES AND THE EXTENSION SERVICE.

The Short Courses and the Extension Service.

Through its Extension Service, the Massachusetts Agricultural College attempts to make every department of the institution a contributing factor toward developing the agriculture and country life of the Commonwealth. The work of the Extension Service divides itself quite naturally into the Short Courses given at the college and the various activities of an educational nature which are carried on all over the State.

Under the usual definition of extension activities, Short Courses are not strictly extension projects. They are rather a part of the academic work of the institution. For the sake of administrative efficiency it has seemed best to place them in charge of the director of the Extension Service in so far as organization and direction are necessary. An effort is made through these courses to bring to the college, for a few days or a few weeks, as many people as can possibly be reached in this way. In the main, the instruction in the Short Courses is given by the regular teaching force of the college, the same laboratories and equipment being used for this work as in the regular college work.

The Extension Service proper comprises various methods for the dissemination of agricultural information to the people of the Commonwealth who are interested in agriculture and country life, but who cannot come to the college for even a short time. The object of the Extension Service is to make the college as useful to the people of the Commonwealth as possible.

A. THE SHORT COURSES.

ORGANIZATION AND DESCRIPTION.

The work is organized thus: —

Short Courses given at the College.
1. Winter School.
    (*a*) Ten Weeks' Winter Course.
    (*b*) Apple Packing School.
    (*c*) Farmers' Week.
    (*d*) Beekeepers' Course and Conference.
    (*e*) Poultry Conference.
2. Summer School.
    (*a*) The Summer School (General Course).
    (*b*) Conference for Rural Community Leaders.

EXPENSES IN THE SHORT COURSES. — The expense of attending any of the Short Courses will be about as follows: —

Registration fee,	$5
Furnished rooms in private houses,	$1.50–$3
Board at college dining hall, per week,	$4
Board with private families, per week,	$5–$6

It is expected that a lunch counter will be operated in connection with the college dining hall. Meals may be obtained there *à la carte* at very reasonable prices.

Students in each of the dairy courses must provide themselves with two white wash suits and a white cap for use in the practical dairy work. The cost in Amherst is about $1.25 for suit and cap.

REQUIREMENTS FOR ADMISSION TO SHORT COURSES. — No entrance examinations are required, but students are advised to review their school work in English and arithmetic. Practical experience in farm, garden, orchard or greenhouse work will be an advantage. The courses are open to both men and women.

Students must be at least eighteen years of age and must furnish satisfactory evidence of good moral character. References are required and these are investigated before applicants are accepted.

Winter School.

COURSES IN THE TEN WEEKS' WINTER SCHOOL (JAN. 6 TO MARCH 14, 1913). — The following courses were given: —

1. Soil Fertility. Associate Professor HASKELL. Three periods a week for ten weeks.
2. Field Crops. Mr. E. M. McDONALD. Three periods each week for ten weeks.
3. Breeds and Breeding. Associate Professor McLEAN and Mr. QUAIFE. Three one-hour and two two-hour periods each week for ten weeks.
4. Feeding and Management. Associate Professor McLEAN and Mr. QUAIFE. Two periods each week for ten weeks.
5. Dairying. Associate Professor LOCKWOOD, Mr. COONS and assistants. Three one-hour, two two-hour and two three-hour periods each week for ten weeks.
6. Dairy Bacteriology. Associate Professor LOCKWOOD. Two periods each week.
7. Animal Diseases and Stable Sanitation. Professor PAIGE. Two periods each week for ten weeks.
8. Poultry. Associate Professor GRAHAM. Five one-hour and two two-hour periods each week for ten weeks.
9. Fruit Growing. Professor SEARS. Four lectures and one laboratory period each week for ten weeks.
10. Market Gardening. Assistant Professor YEAW. Two periods each week for ten weeks.
11. Landscape Gardening. Mr. HARRISON. Two periods each week for ten weeks.
12. Floriculture. Professor WHITE. Five periods each week for ten weeks.
13. Forestry. Professor CLARK. One lecture a week for ten weeks.
14. Botany. Assistant Professor OSMUN and Mr. McLAUGHLIN. Three periods each week.
15. Entomology. Professor FERNALD and assistants. Three periods each week for ten weeks.
16. New England Agriculture (required). Two periods a week for ten weeks.
17. Farm Buildings. Professor FOORD. One period a week for ten weeks.
18. Farm Accounts. Professor FOORD. Two periods each week for ten weeks.
19. Mechanics. Associate Professor LOCKWOOD and Mr. SCHROYER. Two periods each week for ten weeks.
20. Rural Sanitary Science. Assistant Professor GAGE. Two periods each week for ten weeks.
21. Beekeeping. Assistant Professor GATES. Two periods each week for ten weeks.
22. Rural Improvement. Professor WAUGH. One lecture each week for ten weeks.

APPLE PACKING SCHOOL. — The work of this school, which is conducted by the department of pomology, is of a practical nature and includes both box and barrel packing. Persons taking the course will become familiar with the various types of packs and will receive sufficient practice to enable them to do good commercial packing.

The work in packing is supplemented by lectures on phases of commerical orcharding, such as planting, varieties, spraying, pruning, harvesting and marketing.

A fee of $5 to help pay for fruit and other materials used is charged for this course.

FARMERS' WEEK. — In order to reach those who cannot come to the college for a longer time this very practical course, four days in length, is given each year. The regular college equipment is used and work of the regular faculty is supplemented by lectures and demonstrations given by eminent men.

The work is divided into four sections: (1) General agriculture, to include farm management, farm crops and so forth; (2) Dairying, animal breeding and feeding, poultry, veterinary science and bacteriology; (3) Horticulture, to include fruit growing, market gardening, floriculture and forestry; (4) Farmers' wives' section, including lectures and demonstrations in home economics, cooking and problems of homemaking.

Features of the week are the evening lectures by specialists along agricultural lines, the conference pertaining to problems of rural betterment aside from practical agricultural topics, a corn show, grain show, dairy show and so forth.

The Massachusetts Dairymen's Association and the Massachusetts Agricultural College Agricultural Improvement Association hold their annual meetings at the college during this week.

Complete programs of the 1914 Farmers' Week may be obtained in February, 1914.

BEEKEEPERS' COURSE. — In the last three years a complete apiary and equipment has been brought together at the college, under the direction and management of Dr. Burton N. Gates. This equipment furnishes the best of facilities for the teaching of beekeeping and allied subjects. A conference of beekeepers, with extensive exhibits of beekeepers' supplies and apparatus, is held annually at the close of each short course.

The courses offered in 1913 are: —

1. Practical Phases of Beekeeping. Associate Professor GATES.
2. Crops for Honey Bees. Dr. BROOKS.
3. Relation of Bees to the Pollination of Plants. Professor STONE.
4. Origin and Evolution of the Honey Bee. Professor FERNALD.
5. Bees and Beekeepers' Supplies. Professor PAIGE.

The features of the convention are lectures, demonstrations by authorities of national reputation, as well as exhibits of inventors, manufacturers, supply merchants and queen rearers. A special invitation is extended to all beekeepers to display and demonstrate inventions, implements or methods. If table space is desired or special equipment is to be prepared, notice should be sent to Dr. Burton N. Gates, Amherst, Mass., at least two or three weeks before the convention. The college provides covered tables for the exhibits.

POULTRY CONFERENCE. — In order to give a large number of poultrymen, who cannot come to the college for a longer time, practical instruction in modern methods of breeding, feeding, poultry-house construction, operation of incubators and brooders, selecting and judging poultry for utility and for show, marketing poultry products, and so forth, a convention lasting nearly a week is held each year. The regular date has been changed from the spring of the year to the summer, and the meeting will be held July 28–30, 1913.

The Summer School.

The Summer School of Agriculture of the Massachusetts Agricultural College, which was omitted in 1912, reopens July 1, 1913, for a term of five weeks. This is the sixth session of the summer school, those of 1907 to 1911 having been highly successful. The experience of these five years will aid in making material improvements in the session of 1913.

The work of the summer school was designed originally for school teachers. The attendance has been largely of that class, and special attention will be given to the needs of teachers each year. It has been found, however, that there are many others who seek a general knowledge of theoretical and practical agriculture, and who can come to the college conveniently during the summer season. Extended courses are offered for the benefit of such persons also.

The following courses will probably be offered in 1913: —

Soils and tillage, field crops, domestic animals, dairying, poultry husbandry, fruit growing, practical gardening, trees and shrubs, forestry, landscape gardening, elementary chemistry, agricultural chemistry, plant life, cryptogamic botany, bird life, insect life, entomology, beekeeping, home economics, domestic science, home and school gardening, high school agriculture, home floriculture, agricultural economics, rural sociology, rural literature, agricultural education, organized play and recreation, arts and crafts.

From these courses it will be possible to make up programs of work suitable to the needs of almost every one, but especially of school teachers, principals, superintendents, school committeemen, farm owners, householders, suburban residents, clergymen, pastors, preachers, social workers and those who have a general interest in agriculture. Persons who are in doubt as to what courses will best suit their needs had better correspond with the Director of the Extension Service, who will gladly advise in all such matters.

Special courses covering two weeks are offered especially for clergymen, librarians and other rural leaders.

General Plan. — From the courses offered, each student may elect courses amounting to not less than ten nor more than fifteen exercises a week, unless a larger or smaller amount of work is permitted by the director. These courses include a large amount of field work, observation trips, outdoor exercises and laboratory experiments.

Besides these, general field exercises are arranged for one afternoon each week. These are on topics of interest to all. Class excursions are arranged for every Wednesday afternoon, and more extended excursions for the whole school are conducted every Saturday. These are personally conducted by members of the faculty.

Round tables and special discussions are arranged by various instructors as their courses require.

A course of evening lectures on popular topics relating to the work of the school are a feature of the general program. Several able lecturers are engaged each year for this course. No admission is charged for these lectures.

The expenses are low. Amherst is situated in one of the most noted historical and educational centers in this country. Any one interested in problems pertaining to country life should not fail to attend. A descriptive bulletin can be had March 1, 1913.

CONFERENCE OF RURAL LEADERS. — The Annual Conference of Rural Leaders will be held July 30–August 2, as a closing feature of the summer school.

It is hoped the following organizations will co-operate as usual with the college by furnishing teachers and lecturers for their respective sections: the Federation of Churches of Massachusetts, the State Board of Education, the Free Public Library Commission, the Massachusetts Civic League, the State Board of Health, the County Work of the Young Men's Christian Association, the National Board of the Young Women's Christian Association, the New England Home Economics Association, the Russell Sage Foundation and the State Grange.

Definite class instruction will be given each morning. The afternoons will be given up entirely to special and general conferences, demonstrations of organized play, recreation and so forth. The evenings will be given over to music and lectures by the most eminent men who are making a study of rural sociology, economics and education.

The Rural Social Service exhibits will be more elaborate and extensive than in 1912.

The object of this conference is to acquaint those who are leaders in their respective communities with the work that is going on, not only in Massachusetts but in New England and other parts of the world, and to give them renewed inspiration and enthusiasm for larger and more intelligent efforts.

Teachers, clergymen, grange officers, librarians, county Y. M. C. A. workers, town officers, boards of health, officers of village improvement societies, homemakers, school officers, and all others interested in community development, are cordially invited to attend this conference. The expenses for board and room are low. There are no tuition or registration fees.

A complete program will be published in June, 1913, and can be had on application.

B. THE EXTENSION SERVICE.

ORGANIZATION AND DESCRIPTION.

1. Special Days for Foreigners, Agricultural Associations, etc.
2. Instruction given away from the College.
    (1) Correspondence Courses.
    (2) Lecture Courses and Demonstrations.
    (3) Conferences for Community Development.
    (4) Extension Schools of Agriculture.
    (5) Educational Trains (Steam and Trolley).
    (6) Educational Exhibits, with Lectures and Demonstrations at Fairs.
    (7) Demonstration Orchards.
    (8) Dairy Improvement Associations.
    (9) The Massachusetts Agricultural College Agricultural Improvement Association.

(10) Agricultural Surveys.
(11) Advisory Work with State Institutions, Individuals, etc.
(12) Publications, "Facts for Farmers," etc.
(13) Student Extension Work.
(14) Faunce Demonstration Farm.
(15) Boys' and Girls' Clubs.
(16) Demonstration Plots.
(17) Traveling Libraries.
(18) Co-operation with various organizations already in existence.
(19) District Field Agents.
(20) Information by Correspondence, etc.

1. *Special Days for Foreigners, Associations, etc.*

Days are set aside for special attention to the interests of foreigners, of agricultural organizations, etc.

AGRICULTURAL ORGANIZATIONS. — It has been especially pleasing to the college to have organizations such as the Massachusetts Poultry Association, the Massachusetts Fruit Growers' Association, Market Gardeners' and Breeders' associations, and others, meet frequently at the college. Usually a program of one or two days is provided, largely by the college faculty. These meetings serve the twofold purpose of giving the members of these organizations a chance to inspect the equipment and see the work that is being carried on by the college, and it also gives the college men a chance to find out the needs of the men engaged in the various lines of agriculture. It is hoped that other organizations besides those mentioned above will also meet at the college and that meeting will be even more frequent than in the past.

POLISH FARMERS' DAY. — In order to show the Polish farmer — who forms a large part of the population of this section of the Connecticut valley — what the college has to offer him, a Polish Farmers' Day is held each year with much success. Members of the faculty give lectures which are interpreted by Mr. K. J. Wolski of Holyoke; some of the Polish farmers who have made a success of farming also give talks. The Immigration Department of the State, the Y. M. C. A. and the Polish American Alliance co-operate with the college in this work.

2. *Instruction given away from the College.*

An abstract follows of the instruction that is given away from the college. The abstract divides this instruction into correspondence courses and instruction not included in the correspondence course.

CORRESPONDENCE COURSES. — The correspondence courses are offered by the college in response to calls from all sections of the State from people who desire agricultural information, but who cannot come to the college for it. The courses are designed to meet the needs of farmers, dairymen, stock breeders, fruit growers, market gardeners, floriculturists and teachers in elementary schools, high schools, academies or normal schools.

Since agricultural science and practice are changing so rapidly, it is the purpose to give a summary of the latest information on the subjects treated, yet in such language that any who pursue the study can readily understand the work. Additional courses, covering other subjects, will be added from year to year.

Method of Conducting Correspondence Work. — While a large number of books have been written on various agricultural subjects, very few of them are especially adapted to the correspondence course work. For this reason our courses are conducted principally by specially prepared lessons. The subject-matter partakes somewhat of the lectures that are given to the college classes. Whenever possible we recommend one or two books which ought to be purchased and read along with the course. Other books are recommended for collateral reading, which oftentimes can be obtained from the local libraries.

The courses are especially recommended to the Y. M. C. A. and to granges and other farmers' clubs for study. It is to be hoped that grange lecturers, club secretaries, and other interested persons, will organize study classes. If the size of the class, or the interest which the members take in the subject, is sufficient, we shall be pleased to send a representative of the college to the class from time to time to discuss the work and offer suggestions. A description of the correspondence courses follows: —

1. Soil and Soil Improvement. Director HURD.
2. Manures and Fertilizers. Director HURD.
3. Field Crops. Associate Professor HASKELL.
4. Farm Dairying. Associate Professor LOCKWOOD.
5. Fruit Growing. Professor SEARS and Mr. REES.
6. Market Gardening. Assistant Professor YEAW.
7. Animal Feeding. Mr. STORY.
8. Floriculture. Professor WHITE. Part I. The general culture of plants, including those grown out of doors as well as those grown under glass. Part II. Greenhouse construction and heating. Part III. Carnation culture. Part IV. Rose culture. The cost of each part, not including the text-book, is $1.
9. Farm Accounts. Professor FOORD.
10. Entomology. Professor FERNALD.
11. Agricultural Education. Professor HART.
12. Beekeeping. Assistant Professor GATES.
13. Forestry. Professor CLARK.
14. Shade Tree Management. Professor STONE.
15. Agriculture in the Elementary Schools. Associate Professor MORTON.
16. Community Co-operation in Elementary Education. Associate Professor MORTON.
17. Poultry Husbandry. Associate Professor GRAHAM. (Will be ready February, 1913.)

Enrollment for Correspondence Courses. — Students may enroll in the courses any time between September 1 and June 1 of the following year. It has been found advisable not to continue the courses through the summer because the farmers as well as the other students are so busy that they cannot spend the necessary amount of time upon the lessons during the summer months. We are better equipped than we were last year to handle the great number of students who desire these courses, and we hope to be able to take care of all the students who enroll. An early enrollment is advised, however.

Enrollment must be made on the card which is furnished by the college. This will entitle the student to a suitable set of covers and other privileges.

Expenses of the Correspondence Courses. — In order that none may enroll but those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at the uniform rate of $1 for each course, except in Course 8, where it is necessary to charge $1 for each of the four parts, as each part is really a course in itself. This fee is payable strictly in advance when the enrollment card is sent, and the first lesson of the course will not be sent until the fee is received.

This fee is not charged to cover cost of preparing the course, for this, in time of the instructors, is many times what is received, but it is used to defray the expenses of postage and materials which are used in preparation of the lessons, and to insure a higher quality of work from those who enroll.

The cost of the text-book, when one is used, is in addition to the enrollment fee. We strongly urge all students to purchase one or two books to be used in connection with each course, because they can be kept and used for reference purposes after the course is completed. We have made arrangements with the Johnson Book Company, Amherst, Mass., to handle all of these books at reduced rates. For a catalogue of books and prices, address the Johnson Book Company. Remittances should be made by money order or check.

LECTURE AND DEMONSTRATION COURSES AWAY FROM THE COLLEGE. — The renewed and unprecedented interest in agriculture and rural life makes many more calls on the college for lectures and demonstrations than can be met. These calls come from all sorts of organizations, and the audiences are usually of good size and composed of interested people, who are eager to get the latest scientific information to use in their work. A list of lectures and their subjects can be obtained upon request.

EXTENSION SCHOOLS OF AGRICULTURE. — The extension schools held by the college during the past year were most successful, and many applications are being received for schools during 1912–13. An effort is being made so to locate these schools that they may best serve the people of the whole State. Valuable features are being added, and the work will be kept up to the highest possible standard.

EDUCATIONAL EXHIBITS, LECTURES AND DEMONSTRATIONS AT FAIRS. — During the past year lectures and demonstrations were given at sixteen fairs throughout the State. It is expected that during the next year a new college exhibit will be prepared which may be loaned to the fairs and other organizations which ask for an exhibit each year. Aside from the lectures and demonstrations which were given, successful stock judging contests were held under the direction of the college at 13 fairs.

DEMONSTRATION ORCHARDS. — During 1912, 2 new orchards have been planted and 1 orchard renovated, making a total of 10 new orchards and 4 renovated orchards now under the direction of the college. Three new orchards have been promised for the spring of 1913.

DAIRY IMPROVEMENT ASSOCIATIONS. — At the present time three associations have been organized. Others will be started as competent official testers can be found.

THE MASSACHUSETTS AGRICULTURAL COLLEGE AGRICULTURAL IMPROVEMENT ASSOCIATION. — This is an organization largely of graduates and ex-students of the college, banded together for the purpose of agricultural betterment in Massachusetts. There are at the present time about 136 members, 30 of whom are taking active part in the producing of high-class seed corn and seed potatoes, and in demonstrating the possible improvement of worn out pastures.

The usefulness of this association in the State will depend almost wholly upon the energy with which the members enter into the plans worked out by the executive committee of the association. That great things are possible for the association is shown by the work done by similar associations in other States.

Agricultural Surveys. — Through these surveys an attempt is made, by systematic study, to find out the exact conditions of farm management, including dairying, orcharding, poultry raising and other specialties, the income which is derived from these, and the facilities for marketing products. An inquiry into the social, educational, religious and moral life of rural communities is also made.

Advisory Work with State Institutions, Individuals, etc. — For the past two years special effort has been made to comply with the requests of State organizations and individuals for advice. Visits have been made when possible, but it is impossible to comply with half of the requests which come in each year.

Extension Service Publications. — Each year bulletins and circulars descriptive of the various short courses are published. A monthly pamphlet, "Facts for Farmers," is also issued. It is the aim of this pamphlet to give timely information on agricultural subjects in a brief and simple manner. Articles on spraying, pruning, poultry, clean milk and so forth have been issued and are in great demand. Bulletins and "Facts for Farmers" will be sent to all who apply for them.

Student Extension Work. — As would be expected in an institution which stands for agricultural improvement in its broadest sense, the students of the Massachusetts Agricultural College are eager to have a hand in the general work of community betterment carried on by the college staff. A large number of students are employed each year in the teaching of English to foreigners in towns located near Amherst, and in carrying on helpful meetings of a general nature throughout the western part of the State. Calls for this kind of work are many, and the willingness on the part of the students is increasing from year to year. Under efficient management this work promises to be very successful in every detail.

The Faunce Demonstration Farm. — This farm, located at Sandwich, is under the direction of a committee from the college faculty, of which the Director of the Extension Service is chairman. The farm has demonstrated beyond a doubt that small fruits, vegetables and poultry can be raised at a profit on Cape Cod. Through the work of this farm the whole community has taken on new life. The superintendent of the farm, Mr. A. W. Doolittle, has taught agriculture in the schools of the village and has given much help to the farmers of Barnstable County by his personal visits to farms.

Department of Agricultural Education. — The extension work of this department is devoted to the promotion of agriculture and practical arts relating to country life in the public schools of the State. This is done by means of conferences with school officials and school patrons, the promotion of agricultural clubs among the school children and giving lectures before granges, farmers' clubs, and other organizations interested in this line of endeavor. The work of the agricultural clubs is under the local management of the superintendent of schools or of some one suggested by him. Each town is expected to hold an exhibit of products. Exhibits covering rather extensive districts are incorporated with the various agricultural fairs in the State. In this way the promotion of elementary instruction in agriculture is carried on by the combined efforts of the public schools, of the patrons of the schools through their agricultural fairs, and of the Agricultural College.

The college aspect of the work is under the immediate direction of Associate Prof. O. A. Morton. His entire time is devoted to it. His services are at the disposal of the schools and school patrons in helping to promote the teaching of agriculture.

DEMONSTRATION FIELD PLOTS. — Aside from the work done by the Massachusetts Agricultural College Agricultural Improvement Association, little has been done toward placing demonstration plots in different sections of the State. This work is to be developed during the coming year, however.

LIBRARY EXTENSION WORK. — The college library has charge of this part of the Extension Service, which has to do with the circulation of agricultural literature throughout the State. This line of endeavor was instituted in 1910 by the sending out of four collections of books on agriculture and related subjects. The demand for these traveling libraries has been such that the work has grown to splendid proportions, there being now on hand a collection maintained, separate from the regular college library equipment, of nearly 600 books and pamphlets especially for this purpose. This book material is loaned out to the public libraries of the State upon request, and for such periods of time as may be regulated by supply and demand. Collections vary in size and character according to the nature of the need of the locality. From January to October, 1912, a total of 629 volumes were loaned to 37 libraries.

CO-OPERATION WITH EXISTING ORGANIZATIONS. — The aim of those in charge of the Extension Service has been, from the start, to co-operate with existing organizations so far as possible. During the past three years it has co-operated with the State Board of Agriculture, the State Board of Health, the State Dairy Bureau, the State Grange, the Boston Chamber of Commerce, the Springfield Board of Trade, the work of several of the various village improvement associations, the Tent Evangelistic Work in western Massachusetts, Federation of Churches of Massachusetts, State Board of Education, Free Public Library Commission, Massachusetts Civic League, State Board of Health, county work of Y. M. C. A., New England Home Economics Association, the Russell Sage Foundation, the Board of Home Missions, besides men's clubs in churches, women's clubs, schools and other agencies.

CO-OPERATION WITH THE UNITED STATES DEPARTMENT OF AGRICULTURE. — Through the co-operation of the United States department it has been possible to place in Massachusetts a field agent whose duty it is to visit farms and consult with the owners, aiding them in questions of farm management, and to conduct farm management investigations.

DISTRICT FIELD AGENTS. — It is hoped that the college will soon be able to have in each county of the State a field agent whose duty it will be to visit farmers in the county, bringing to them the best advice the experts at the college can give.

During the coming year Mr. A. W. Doolittle, superintendent of the Faunce Demonstration farm, Sandwich, will serve the college on part time as field agent for Barnstable County.

Information by Correspondence. — Besides these things already mentioned thousands of helpful circulars and bulletins are printed and distributed, hundreds are helped through personal visits to farms, and still larger numbers through letters of inquiry which always receive the most careful attention from every department of the institution.

Pamphlets and bulletins are sent free to all who ask for them, and correspondence from any who desire such help as has been mentioned is gladly received. Address all communications to the Director of the Extension Service, Massachusetts Agricultural College, Amherst, Mass.

Statistics of the Extension Service for 1912.

		People reached during 1912.
Enrollment in Short Courses.		
Ten Weeks' Winter Course,	131	
Poultry Course,	80	
Apple Packing School,	40	
Farmers' Week,	1,040	
Beekeepers' Course,	10	
Polish Farmers' Day,	57	
Conference for Rural Community Leaders,	184	
		1,482
Correspondence Courses.		
Present enrollment,	578	
Courses completed and work dropped during year,	175	
		753
Lectures.		
Number given,	591	
Approximate attendance,	27,469	27,469
Boys' and Girls' Clubs.		
Number of clubs,	127	
Number of members,	13,462	13,462
Massachusetts Agricultural College Agricultural Improvement Association.		
Members enrolled,	137	137
Dairy Improvement Associations.		
Members enrolled,	55	55
Extension Schools.		
Total membership in five schools,	500	500
Student Extension Work.		
Attendance each week at four evening schools,	80	80
Mailing List.		
Facts for Farmers,	1,553	
Short Courses,	3,764	
		5,317
Total,		49,366

GENERAL INFORMATION.

GENERAL INFORMATION.

A. FINANCIAL AND ADMINISTRATIVE.

STUDENT EXPENSES.

TUITION. — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of $40 a year. The tuition charged persons not citizens of the United States is $120 a year. Students entering from Massachusetts are required to file with the president a statement signed by either town or city clerk stating that the applicant's father is a legal resident of Massachusetts.

DORMITORIES AND BOARD. — The college has dormitory accommodations for about 62 students. The rooms in the dormitories are occupied by the upper classmen, hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suits of three, — one study room and two bed rooms. These rooms are heated by steam and lighted by electricity; they are cared for by students occupying them. The dormitory rent for each person varies from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1.25 to $3 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present the price of board there is about $4 a week. Board is furnished at cost, the price being determined by adding 5 per cent. to the audited rate for the previous three months, and at the end of the period final settlement is made on the basis of actual cost.

EXPENSES.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts free; other citizens of the United States, $40 a year; foreigners, $120 a year.

	Low.	High.
Room in college dormitories or in private houses,	$39 00	$110 00
Board in college dining hall, $4 a week,	144 00	144 00
Laundry, 50 cents to 85 cents a week,	18 00	30 00
Military uniform, first year,	13 50	13 50
Laboratory fees,	2 00	20 00
Books, stationery and other miscellaneous,	23 50	32 50
	$240 00	$350 00

OTHER EXPENSES. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe keeping of student furniture in dormitories either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between $250 and $350 per year.

Initial Charges.

At the opening of the college year, before students are registered in their classes, the following charges are payable at the treasurer's office: —

	Freshmen.	Sophomores.	Juniors and Seniors.
Board (if at college dining hall) four weeks in advance,	$16 00	$16 00	$16 00
Subscription to "Signal" (college paper),[1] . .	1 50	1 50	1 50
Assessment for support of Social Union, . . .	1 50	1 50	1 50
Laboratory fees: —			
Chemistry, ...	5 00	–	–
Zoölogy, ...	–	2 00	–
For elective subjects, ...	–	–	1 00–10 00
Military uniform, ...	13 35	–	–
Room rent (if in college dormitory), ...	–	–	19 50–33 00
Student tax for support of athletics,[1] . . .	8 00	8 00	8 00
	$45 35	$29 00	$47 50–$70 00

---

[1] While this is not essentially a college charge, the treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Signal" is fixed by the managers; the amount of athletic tax by vote of the student body.

Laboratory Fees.

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage.

The fees as indicated below will become effective in September, 1913.

Agronomy: —	Per Semester.
Course 3, ...	$1 50
Course 4, ...	0 50
Course 5, ...	1 00
Course 6, ...	1 00

	Per Semester.
Animal husbandry: —	
Courses 2 and 4, each,	$1 00
Course 7,	2 00
Botany: —	
Graduates,	4 00
Courses 2 and 3,	3 00
Course 4,	2 00
Course 5,	1 00
Courses 7, 9, 11, 13,	3 00
Chemistry: —	
Courses 1, 2, 7, 8, 13, 15,	3 00
Courses 3, 4, 5, 6,	4 00
Courses 9, 10, 11, 12, 14, 16,	5 00
Course 18,	No fee.
Entomology: —	
Graduates,	3 00
Entomology 3 and 4 each,	3 00
Landscape gardening: —	
Landscape gardening 1,	2 50
Landscape gardening 2,	2 50
Landscape gardening 3,	3 00
Landscape gardening 4,	3 00
Landscape gardening 6,	1 00
Landscape gardening 7,	3 00
Landscape gardening 8,	3 00
Drawing 1 and 2 each,	2 50
Pomology: —	
Pomology 3 and 4 each,	5 00
Poultry husbandry: —	
Course 3,	1 50
Course 4,	2 00
Zoölogy: —	
Elementary 1,	2 00
Invertebrate 3,	4 00
Vertebrate,	4 00

STUDENT AID.

SELF HELP. — A number of students find opportunities for earning money without depending upon the college to furnish them with work, and many are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least $150 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should remember that, owing to the large number of applications for employment, no one man can receive a large amount of work through the college.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and thirty or more students are employed at the dining hall. Applications for student labor should be made directly to the president. Applicants are required to present a certificate, signed by parent or guardian and by one of the selectmen or aldermen of the town or city in which they reside, showing that the applicant needs the assistance. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

Special Notice to Needy Students. — In the last year or two the demand for paid labor on the part of new students has far exceeded the amount of employment that the college can offer. The college cannot promise work to any student, particularly to freshmen; it accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.

Student Accounts.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each semester. This rule is strictly adhered to, and no student will be allowed to register in his class until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each semester at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the semester he is more than one week in arrears in his payment for board.

All money due for student labor shall be applied on account toward any bills that a student may owe to the institution.

Student Relations.

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standards of student deportment.

Any student known to be guilty of dishonest conduct or practice must be reported by the instructor to the president for discipline.

The privileges of the college may be withdrawn from any student at any time, if such action is deemed advisable.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right not only to suspend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may also be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences ("cuts"). According to the rules a student is allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

B. COLLEGE ACTIVITIES.

General Exercises.

Chapel exercises are as a rule held four mornings each week. On Wednesday, instead of chapel an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is usually held during the winter months. Students are required to attend these general exercises, although the president is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

Student Activities.

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established about four years ago. All students become members of the Union by paying a small fee. The Union is designed to become the center of student interests. In North College it has a trophy room and a large lounging room for music, reading and study. In the basement of this building there is also a game room for pool and billiards. In the fall and winter months the Union gives a series of entertainments, free to the students and faculty.

The College Senate is composed of representatives of the junior and senior classes. This body serves as a general director of under-graduate conduct, and represents before the faculty the interests of the student body.

The M. A. C. Christian Association is active both socially and religiously. Under its direction voluntary Bible classes are conducted during the winter months. A Catholic Club has also been organized.

The musical organizations include an orchestra, a mandolin club and a glee club. These furnish music for college meetings, and occasionally give concerts at the college and at other places. A military band is maintained as part of the cadet corps.

A Dramatic Club has been organized, and each year presents a play.

The Public Speaking Council represents the students' interest in debate and oratory.

The Athletic Association represents in the college the interests of football, baseball, track, hockey and tennis.

A Rifle Club has been organized for a few years. Teams representing this club have repeatedly won the intercollegiate championship of the country, both in indoor and outdoor contests.

The college publications are the "Signal," published weekly by the student body, and the "Index," published annually by the members of the junior class. As a part of the work in journalism, students supply The Bay State Ruralist, a special page in the "Springfield Union."

The Stockbridge Club is an organization of students especially interested in practical agriculture, horticulture and floriculture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

Scientific clubs also exist in the departments of French, entomology and landscape gardening.

C. ACADEMIC AND DEPARTMENTAL.

Degrees.

Those who complete a four-year course receive the degree of bachelor of science. The fee for graduation from the college is $5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of $10. Credit may sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-years course of study, and present a satisfactory thesis, will be granted the degree of doctor of philisophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest fifth of the senior class who have attained an average grade of at least 85 per cent. during their college course.

Prizes.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes offered in 1912 are: —

Agriculture. — The Grinnell prizes (first, second and third), given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. They are $25, $15 and $10.

Animal Husbandry. — The F. Lothrup Ames' Prize, given by F. Lothrup Ames, Langwater Farms, North Easton, Mass., consisting of $150 a year, offered for a period of five years, beginning 1912, to be given to the three students standing highest in the work of advanced live-stock judging, and to be used in defraying their expenses incurred by participation in the students' judging contest at the National Dairy Show, Chicago.

Botany. — The Hills prizes (amounting to $35), given by Henry F. Hills of Amherst, will be awarded to members of the senior class as follows: for the best herbarium, $15; for the best collection of Massachusetts trees and shrubs, $10; for the best collection of Massachusetts woods, $10. No collection deemed unworthy of a prize will be considered. In 1913, a prize of $5 is offered to that member of the sophomore class who presents the best herbarium of native flowering plants.

General Improvement. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who, during the first two years in college, has shown the greatest improvement in scholarship, character and example.

Public Speaking. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declarations in the Burnham contest, $15 and $10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, a gold medal and $20 and $15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and $15. The preliminary contests in debate are open, under certain restrictions, to all regular students. Interclass debates, with prizes, are also held annually.

Military Diplomas.

Military diplomas are given to those men receiving the degree of bachelor of science who by their work in the department of military science have shown themselves worthy of distinction. These diplomas recommend those receiving them for commissions in the United States army or the militia of the several States.

Equipment.

Agronomy. — The work in agronomy is carried on by means of lectures, laboratory work and field work. The laboratories are in the north wing of South College. The seed laboratory is equipped with samples of the different grains and seeds of economic importance in field culture, and with apparatus for the study and testing of these seeds, including microscopes and the apparatus necessary for viability and purity tests. The soil laboratory is well equipped with apparatus for the study of the physical properties of soils, including an electric centrifuge; an electric resistance thermometer for determining soil and other temperatures; evaporimeters and drying ovens; and good balances. For the work in drainage there is available a surveyor's transit, a wye level, drainage levels, rods, steel tapes, surveyor's pins, and a set of drainage tools. The college farm may also be considered a part of the agronomy laboratory.

Animal Husbandry. — The most important part of the equipment for laboratory work in animal husbandry is the new judging pavilion, which will be completed by Jan. 1, 1911. This will give new opportunities for practice work in management of live stock, together with demonstrations in judging. Another very essential part of the equipment for this department is the live stock of the college farm, which includes pure bred and grade Ayrshire, Guernsey, Holstein and Jersey cattle, French coach and Percheron horses, and Berkshire swine. A set of plaster-of-paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different food stuffs available for the use of the New England farmer, are included in the equipment for this work.

BOTANY. — The department of botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for sophomore and junior work, and one for senior work; and three rooms specially fitted for graduate students. The experiment station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with all necessary conveniences. The basement contains a bacteriological laboratory, a seed and soil room; and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe, and other tools and appliances. In the senior laboratory is a room designed especially for physiological work; this laboratory is well supplied also with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc. The herbarium contains 15,000 species of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and about 12,000 sheets of fungi. The laboratory is equipped with 90 modern compound microscopes and a number of dissecting microscopes, microtomes and a large series of charts. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experiment work and for housing material often needed in the laboratory.

CHEMISTRY. — The chemical department of the college now occupies the entire building previously known as the "old chapel." The basement is used for the storage of apparatus and chemicals. The first floor contains large laboratories devoted to qualitative and quantitative analysis and organic and physiological chemistry. The second floor is occupied by the general lecture room, by offices for the several members of the staff, by laboratories for physical chemistry and for beginners in quantitative analysis. The third floor has recently been fitted for work in general chemistry, and has desk room and hoods sufficient to accommodate 66 students at one time. Each place is supplied with reagents and apparatus for independent work. This floor is also occupied by a lecture room that will seat 100 students.

The entire laboratory is well equipped with the necessary apparatus and chemicals for all students who desire to perfect themselves as expert chemists, or who wish to study chemistry as a supplement to some other line of practical or scientific work. The equipment includes a valuable and growing collection of specimens and samples of minerals, soils, raw and manufactured fertilizers, food, milk products, fibers, various other vegetable and animal products and artificial preparations of mineral and organic compounds; and also a series of preparations for illustrating the various stages of different manufactures from raw material to finished product.

DAIRYING. — Two large, well-drained, cement-floored rooms in the South College are used for dairy work. These are equipped with a milk heater, separators, coolers and aërators, a pasteurizer, ripening vats, churns, butter workers, a mechanical can washer, a sterilizer, and other small apparatus necessary to a well-equipped dairy or butter factory. A third room is equipped with hand and power Babcock milk-testing machines and other apparatus used for milk and butter testing. These rooms have individual lockers for students. The new sanitary dairy and stable give an opportunity for practical laboratory work in the production and handling of certified milk.

DINING HALL. — Draper Hall, a brick colonial building, equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college.

DRAWING. — Two rooms on the second floor of Wilder Hall are occupied by the classes in drawing. They are equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details, and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

ENTOMOLOGY. — GENERAL ENTOMOLOGICAL LABORATORIES. — The equipment for work in entomology is perhaps unexcelled in this country. In the new fireproof entomogical and zoölogical building, first used in the fall of 1910, are fine lecture rooms, laboratories and museums for use in the different courses. The senior laboratory will accommodate 70 students at one time; a desk, equipped with compound microscope and accessories, together with glassware, reagents, etc., and supplied with electric light and gas is provided for each student. Dissecting microscopes, microtomes and other apparatus are available for use. The graduate laboratory is similarly equipped. It will accommodate 20 students. The large and rapidly growing collections of insects are in a room adjoining both laboratories. In the library of the building is an excellent collection of the more important books and journals treating of entomology, and many more are accessible in the college library and in the private libraries of the professors, in all making available more than 25,000 volumes, many of which cannot be found elsewhere in the United States. A card catalogue giving references to the published articles on different insects contains more than 60,000 cards, and is the largest index of its kind in the United States, and probably in the world. In the basement is a pump room where may be studied the construction of the different types of spray pump and methods of repairing them; hose, couplings, nozzles and the other parts of spraying outfits are provided, not only for examination but for use. In another room, provided with chemical desks and apparatus, methods for the determination of the impurities and adulterations of insecticides are taught. As the insectary of the Massachusetts Agricultural Experiment Station is in the same building the facilities it offers are also available. A greenhouse, where plants infested with injurious insects are under observation and experimental treatment, is also open to students. Photographic rooms with cameras and other photographic apparatus are provided, and the large greenhouses, gardens, orchards and grounds of the college offer further opportunities for the study of injurious insects under natural conditions.

Entomology. — Beekeeping. — For this work the main office, museum and lecture rooms are in the entomological building. There is also an apiary covering approximately two acres which will consist of about fifty colonies of bees in various types of hives and maintained for the several practical and experimental purposes. The apiary also includes a collection of nectar-yielding plants representative of the native flora as well as of the more important nectar sources from other localities. Especial opportunity is therefore given for a study of this fundamental problem of forage. Upon the apiary site is an eight-room building (the first in the world erected exclusively for teaching beekeeping) modeled to meet both the requirements of teaching and of a practical apiary. This building contains a boiler room, capacious wintering cellar, wax extraction room, general carpenter and work shop, laboratory, office, honey extraction room and stock room. The beekeeping equipment also includes an unexcelled collection of apicultural implements, natural history specimens and other curiosities. Practically every device used in American apiculture is available, it being the aim of the department to procure new inventions and implements as fast as they appear for the purpose of study and comparison. Available to the students is a private library of apicultural literature consisting of upwards of 700 volumes and papers, possibly the most complete collection in the country. This entire equipment is acknowledged unique in model and in completeness for the United States and for the world.

Farm Administration. — The college farm of 190 acres is under the supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The work in this department includes the production of the common field crops, and the care and raising of the different classes of live stock mentioned under animal husbandry. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied.

Floriculture. — The department of floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a department of floriculture better equipped than this. The legislative appropriation of 1908 has made possible the erection of a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of plant materials.

Forestry. — The department of forestry has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc.; a large assortment of boards illustrative of the various commercial woods found in the lumber markets. The State Forest Nursery, comprising 6 acres of land and containing, approximately, 5,000,000 trees, transplants and seedlings is located on the college farm. Extensive forests containing every variety of tree common to New England are within walking distance of the college. The college campus affords an arboretum containing an exceptionally large number of trees not native to New England. The library contains complete sets of government bulletins, circulars, State reports and all the best books on forestry subjects.

Geology. — A large, well-lighted laboratory for geology, 27 by 50 feet, is in the basement of the new building for entomology, zoölogy and geology. This is equipped with cabinets, models, charts and a teaching collection of rocks. It has a seating capacity of 50 persons. Adjoining this is a smaller laboratory, 21 by 27 feet, for mineralogy, supplied with gas and cabinets for models, crystals and minerals. There is also a small laboratory for grinding thin sections, and a private laboratory, 6 by 19 feet, for analysis work. The geological museum is 27 by 48 feet. It has six large cases for exhibition purposes.

The equipment for geology is being enlarged. At present, in addition to the general items mentioned above, it consists of a petrographic microscope, an illustrative series of thin sections, a small collection of invertebrate fossils, some casts of vertebrate fossils, a collection of the building stones of Massachusetts, and a duplicate set of the Edward Hitchcock survey collection of the rocks and minerals of Massachusetts.

Heating, Lighting and Power. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop.

Landscape Gardening. — The work in landscape gardening is developed in a strong technical four-year course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for thorough work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

Library. — The library — stack room, reading room and office — occupies the entire lower floor of the library-chapel building. It contains nearly 34,000 volumes and a large number of pamphlets, hitherto inaccessible, but which are being put into good working order as fast as possible. Works of a scientific character predominate, but economics, literature and history are well represented and are receiving due attention. The reading room provides a variety of periodical literature, both technical and popular, encyclopedias and general reference books, and a select collection of works for general reading.

The library is now being reclassified and recatalogued, to make the splendid collection of material here gathered together readily accessible and of the greatest working value. Every effort is being made toward developing the library into a vital intellectual center of college life, of equal value to every student, teacher and teaching department. In consequence, only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced.

Lectures are given to regular short course students to enable them to make the best use of the library. Emphasis is laid upon the proper use of the card catalogue, periodical indexes, bibliographies and guides; also, in general, assigned and class-room work, and essay and debate work.

The library hours are from 7.45 A.M. to 9 P.M. every week day, and from 9 A.M. to 2 P.M. on Sundays, in term time. Shorter hours prevail during vacations.

Market Gardening. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and a laboratory particularly equipped for floriculture and market gardening. A good library of works on vegetable gardening is available.

Mathematics and Civil Engineering. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 3 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a queen plane table, 3 wye levels, 2 dumpy levels, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

MILITARY SCIENCE. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

PHYSICAL EDUCATION. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The room used for exercise and recreation is equipped with modern developing apparatus and two hand-ball courts, and is large enough for basket ball. The apparatus can quickly be removed to clear the floor. An out-door board track enables students to secure track practice through the winter. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a bathroom. The gymnasium is open from 9 A.M. to 10 P.M., and exercise may be taken at such hours as do not conflict with military drill or physical education classes. The regulation costume for class exercise consists of a white track suit and white, rubber-sole shoes.

PHYSICS. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

POMOLOGY. — The department of pomology has 10 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There is also a commercial vineyard and a smaller one; in these are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also extensive nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples and plums in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1909–10, for instance, apples for class use were received from British Columbia, Ontario, Quebec, Nova Scotia, Iowa, Wisconsin, Michigan, Connecticut, New York, Oklahoma, Kansas, Colorado, Oregon, New Jersey and Vermont, besides collections of grapes from California and citrus fruit from Florida and Texas.

POULTRY HUSBANDRY. — The poultry plant consists of about 9 acres of land sloping gently to the west. The soil is a fine, rich, sandy loam, well drained. At present the buildings consist of an incubator cellar, 32 by 34 feet, with a capacity of 4,000 eggs, over which is a demonstration building; a pipe brood house (open-pipe system), 14 by 72 feet, which will accommodate 1,200 chickens; a long laying house, 14 by 180 feet, which accommodates 500 layers and furnishes facilities for student work in pen management; a laboratory, 14 by 80 feet, for killing, picking, dressing, crate fattening, cramming, etc.; a storage building, 28 by 42 feet, for experimental incubation, poultry carpentry, poultry mechanics and storage; an experimental breeding house, 18 by 60 feet; the 6 old experiment station buildings, each 12 by 18 feet, to be used as breeding houses, and 11 colony brooder houses. Instruction in this department is given in the form of lectures, demonstrations and practical work. The practical work consists of poultry, carpentry, caponizing, killing, picking, dressing, packing and selling poultry; pen management and fattening; running incubators and brooders, etc. At present the stock consists of 20 leading varieties of poultry. The aim of the department is to keep good specimens of all the most popular varieties of chicken, ducks and geese, so that a thorough course in poultry judging may be given, and that visitors may find the inspection of our stock an education in itself.

PUBLIC SPEAKING. — In connection with the work in public speaking, three regular contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests furnish a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Intercollege contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the College Debating Club.

VETERINARY SCIENCE AND BACTERIOLOGY. — The department of veterinary science and bacteriology occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There are a lecture hall, a museum, a demonstration room, a photographing room and a work shop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in bacteriology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

ZOÖLOGY. — The college offers increased facilities for the study of zoölogy. In the new building for entomology, zoölogy and geology are spacious laboratories for both undergraduate and graduate work. On the first floor is a large sophomore laboratory, 27 by 100 feet, with a present seating capacity of 100 persons. Adjoining this is a smaller room, 20 by 27 feet, for junior and senior courses. On the second floor is a laboratory, 20 by 32 feet, for advanced work. All laboratories are equipped with gas. The equipment consists of 80 compound microscopes and accessories, 70 dissecting microscopes, microtomes and accessories, paraffine baths, incubator, dissecting instruments, glassware and other necessary apparatus.

The large amphitheater lecture hall is used jointly by the departments of entomology and zoölogy-geology. It is equipped with charts and models. The zoölogical museum is drawn upon at all times for illustrative material. The zoölogical museum is 27 by 48 feet. The main room is on the first floor of the building. Above this, on a level with the second floor, is a large gallery. On the main floor are 8 large wall cases and 5 large floor cases for exhibition purposes. The gallery has 1 one large wall case and 2 floor cases with space for 10 additional cases. The zoölogical collection consists of nearly 12,000 specimens. All the chief phyla are represented. Adjoining the museum is a preparator's room for the curator. The museum is open to the public from 1 to 5 P.M. on Saturdays, and on other week days from 3 to 6 P.M. The curator is Associate Professor Gordon.

PRIZES AND AWARDS, 1912.

GRINNELL PRIZES. — The Grinnell prizes, given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture, were awarded as follows: —

First prize, $25, to Benjamin Gilbert Southwick.

Second prize, $15, to Francis Spink Madison.

Third prize, $10, to Eric Nichols Boland.

BOTANICAL PRIZES. — The Hills prizes, given by Henry F. Hills of Amherst, were awarded to members of the senior class as follows: —

A. — For the best herbarium, $15, to Ray Ethan Torrey.

B. — For the best collection of Massachusetts trees and shrubs, $10, to Ray Ethan Torrey.

C. — For the best collection of Massachusetts woods, $10, to Ray Ethan Torrey.

Special sophomore prize for the best herbarium, $5, to Ernest Elwood Stanford.

Honorary mention made of Raymond Edward Nute.

General Improvement. — The Western Alumni Association prize, given to that member of the sophomore class who during his first two years in college has shown the greatest improvement in scholarship, character and example, was awarded as follows: —

Twenty-five dollars to Roland Alfred Payne.

Public Speaking. — The Burnham prizes, given to the students delivering the best and second best declarations, were awarded as follows: —

First prize, $15, to Leroy Everett Haskins.

Second prize, $10, to Isaac Barney Simon.

The Flint prizes, given to the students delivering the best and second best orations, were awarded as follows: —

First prize, a gold medal and $20, to Dau Yang Lin.

Second prize, a gold medal and $15, to Woon Young Chum.

Debating. — The prizes in the annual debate were awarded as follows: —

Fifteen dollars and a gold medal, to Theodore Joseph Moreau.

Fifteen dollars and a gold medal, to Benjamin Franklin Hubert.

Fifteen dollars and a gold medal, to Thomas Hemenway.

The prizes in the interclass debate were awarded as follows: —

To the team representing the Class of 1912, consisting of Theodore Joseph Moreau, Benjamin Franklin Hubert, Thomas Hemenway.

Each member of the above team was awarded a silver cup.

Military Honors. — The following-named cadet officers have been reported to the Adjutant-General of the United States army and to the Adjutant-General of the Commonwealth of Massachusetts, being efficient in military science and tactics and graduating therein with highest honors: —

Cadet Col. Marshall Cotting Pratt.
Cadet Maj. Eric Nichols Boland.
Cadet Capt. Benjamin Gilbert Southwick.
Cadet Capt. Francis Spink Madison.
Cadet Capt. Thomas Hemenway.

Secretaries of Alumni Associations and Classes.

Alumni Secretaries' Association of the Massachusetts Agricultural College.
Secretary: Ralph J. Watts, 1907, Amherst, Mass.

Association Alumni of the Massachusetts Agricultural College.
Secretary: Sidney B. Haskell, 1904, Amherst, Mass.

Local Alumni Association of the Massachusetts Agricultural College.
Secretary: Sidney B. Haskell, 1904, Amherst, Mass.

Alumni Club of Massachusetts.
Clerk: H. Linwood White, 1909, 136 State House, Boston, Mass.

Connecticut Valley Association of the Massachusetts Agricultural College.
Secretary: Charles L. Brown, 1894, 870 State Street, Springfield, Mass.

Massachusetts Agricultural College Club of New York.
Secretary: John Ashburton Cutter, 1882, 262 West 77th Street, New York, N. Y.

Massachusetts Agricultural College Club of Washington, D. C.
Secretary: Clarence H. Griffin, 1904, 1864 Park Road, Washington, D. C.

Western Alumni Association of the Massachusetts Agricultural College.
Secretary: Charles A. Tirrell, 1906, 4012 Perry Street, Chicago, Ill.

Massachusetts Agricultural College Pacific Coast Alumni Association.
Secretary: Thomas F. Hunt, 1905, Berkeley, Cal.

Class Secretaries.

Class of	Secretary.	Secretary's Address.
1871	E. E. Thompson,	5 Jacques Avenue, Worcester, Mass.
1872	F. E. Kimball,	8 John Street, Worcester, Mass.
1873	C. Wellington,	Amherst, Mass.
1874	D. G. Hitchcock,	Warren, Mass.
1875	M. Bunker,	Newton, Mass.
1876	C. Fred Deuel,	Amherst, Mass.
1877	Atherton Clark,	Newton, Mass.
1878	C. O. Lovell,	5 Bromfield Street, Boston, Mass.
1879	R. W. Swan,	41 Pleasant Street, Worcester, Mass.
1880	Alvan Fowler,	413 Post Office Building, Philadelphia, Pa.
1881	J. L. Hills,	59 North Prospect Street, Burlington, Vt.
1882	G. D. Howe,	25 Winter Street, Bangor, Me.
1883	J. B. Lindsey,	Amherst, Mass.
1884	– –	– –
1885	E. W. Allen,	1923 Biltmore Street, Washington, D. C.
1886	Dr. Winfield Ayres,	616 Madison Avenue, New York City.
1887	F. H. Fowler,	Shirley, Mass.
1888	H. C. Bliss,	14 Mechanic Street, Attleborough, Mass.
1889	C. S. Crocker,	1003 South 25th Street, Philadelphia, Pa.
1890	David Barry,	398 Walnut Street, Newtonville, Mass.
1891	H. T. Shores,	177 Elm Street, Northampton, Mass.
1892	H. M. Thomson,	Amherst, Mass.
1893	F. A. Smith,	Turner Hill, Ipswich, Mass.
1894	S. F. Howard,	Amherst, Mass.
1895	E. A. White,	Amherst, Mass.
1896	A. S. Kinney,	South Hadley, Mass.
1897	C. A. Peters,	Amherst, Mass.
1898	– –	– –
1899	D. A. Beaman,	Rio Piedras, Porto Rico.
1900	E. K. Atkins,	15 Hubbard Avenue, Northampton, Mass.
1901	J. H. Chickering,	Dover, Mass.
1902	H. L. Knight,	1420 Buchanan Street, Washington, D. C.
1903	G. D. Jones,	North Amherst, Mass.
1904	P. F. Staples,	North Grafton, Mass.
1905	A. D. Taylor,	1101 Tremont Building, Boston, Mass.
1906	Richard Wellington,	Geneva, N. Y.
1907	Clinton King,	6 Beacon Street, Boston, Mass.
1908	J. A. Hyslop,	860 North Mulberry Street, Hagerstown, Md.
1909	O. B. Briggs,	1015 Fidelity Building, Baltimore, Md.
1910	F. L. Thomas,	Amherst, Mass.
1911	L. M. Johnson,	Newtown, Conn.
1912	F. S. Madison.	East Greenwich, R. I.

DEGREES CONFERRED AND ROLL OF STUDENTS.

Degrees Conferred — 1912.

Doctor of Philosophy.

Bartlett, Oscar Christopher, Westhampton. Massachusetts Agricultural College, B.Sc., 1909.

Master of Science.

McLaine, Leonard Septimus, New York, N. Y. Massachusetts Agricultural College, B.Sc., 1910.

Bachelor of Science (B.Sc.).

Ackerman, Arthur John,	Worcester.
Baker, Horace Mitchell.	Selbyville, Del.
Beals, Carlos Loring,	Sunderland.
Beers, Rowland Trowbridge,	Billerica.
Bent, William Richard,	Marlborough.
Bodfish, Edward Hill,	West Barnstable.
Boland, Eric Nichols,	South Boston.
Brett, Alden Chase,	North Abington.
Brown, Merle Raymond,	Greenwich Village.
Burnham, Arthur James,	Holyoke.
Burr, Frederick Huntington,	Worthington.
Carpenter, Jesse, Jr.,	Attleborough.
Castle, Fred Arlo,	Roseburg, Ore.
Clapp, Raymond Kingsley,	Westhampton.
Curran, Daniel Joseph,	Marlborough.
Deming, Winfred Griswold,	Wethersfield, Conn.
Dodge, Albert Wesley,	South Hamilton.
Fagerstrom, Leon Emanuel,	Worcester.
Fisherdick, Warren Francis,	Amherst.
Fitts, Frank Orus,	North Amherst.
Fitzgerald, John Joseph,	Holyoke.
Fowler, George Scott,	Wayland.
Gallagher, James Andrew,	North Wilmington.
Gaskill, Lewis Warren,	Hopedale.
Gelinas, Louis Edmond,	North Adams.
Gibbs, Robert Morey,	Chester.
Gibson, Lester Earl,	Melrose.
Gray, Frank Leonard,	East Boston.
Hall, Henry Bass,	Northampton.
Hall, Horace Whitney,	Newton Centre.
Hallowell, Royal Norton,	Jamaica Plain.
Hamblin, Stephen Francis,	Marstons Mills.
Harlow, Joseph Alvin,	Turners Falls.
Heald, Jay Morrill,	Watertown.
Hemenway, Thomas,	Nashua, N. H.
Hickey, Francis Benedict.	Brockton.
Hills, Frank Burrows,	Bernardston.
Holland, Henry Lucius,	Amherst.
Hubert, Benjamin Franklin,	White Plains, Ga.
Kingsbury, Arthur French,	Medfield.
Lamson, Robert Ward,	Amherst.
Lin, Dau Yang,	Shanghai, China.
Lodge, Charles Albert,	Manchester.
Madison, Francis Spink,	East Greenwich, R. I

Martin, James Francis,	Amherst.
McGarr, Thomas Anthony,	Worcester.
Merkle, George Edward,	Amherst.
Merrill, Fred Sawyer,	Danvers.
Moreau, Theodore Joseph,	Turners Falls.
Mueller, Alfred Frederick,	Jamaica Plain.
Noyes, Harry Alfred,	Marlborough.
O'Flynn, George Bernhard,	Worcester.
Parker, Ralph Robinson,	Malden.
Pearson, Charles Cornish,	Arlington.
Peckham, Curtis,	New Bedford.
Philbrick, William Edwin,	Taunton.
Pierpont, John Edwards,	Williamsburg.
Pratt, Marshall Cotting,	Holderness, N. H.
Puffer, Stephen Perry,	North Amherst.
Raymond, Arthur Nathaniel,	Leominster.
Reed, Robert Edward,	Abington.
Robinson, Earle Johnson,	Hingham.
Rockwood, Lawrence Peck,	Waterbury, Conn.
Sanctuary, William Crocker,	Amherst.
Sellew, Lewis Raymond,	Natick.
Shaw, Ezra Ingram,	Amherst.
Southwick, Benjamin Gilbert,	Buckland.
Stack, Herbert James,	Conway.
Terry, Leon,	Springfield.
Torrey, Ray Ethan,	North Leverett.
Tower, Daniel Gordon,	Roxbury.
Tupper, George Wilbur,	Roxbury.
Turner, Howard Archibald,	Dorchester.
Wales, Robert Webster,	North Abington.
Warner, Roger Andrew,	Sunderland.
Weaver, William Jack,	Alandar.
Whitney, Charles Everett,	Wakefield.
Wilbur, Emory Sherman,	East Wareham.
Wilde, Earle Irving,	Taunton.
Williams, Edward Roger,	Concord.
Williams, Silas,	Fall River.
Wood, Howard Holmes,	Shelburne Falls.
Young, Edwin Burnham,	Dorchester.

ROLL OF STUDENTS.

SENIOR CLASS.

Adams, Winford Frederick,[1]	East Leverett,	Theta Chi House.
Allen, Harry Willis,	West Pelham,	West Pelham.
Anderson, Oscar Gustaf,	East Pepperell,	Entomological Building.
Angier, Harris William,	Westborough,	South College Tower.
Baird, Harry Albert,[1]	Somerville,	4 South College.
Baker, Dean Foster,	Fairhaven,	15 North College.
Barber, George Ware,[1]	Hyde Park,	13 North College.
Bevan, Laurence Algur,[1]	Newtonville,	15 North College.
Birdsall, Webster Jennings,[1]	Otego, N.Y.,	Kappa Sigma House.
Borden, Ralph James,	Fall River,	7 North College.
Brewer, Charlesworth Herbert,	Mt. Vernon, N.Y.,	C. S. C. House.
Brown, Herbert Augustine,	Saxonville,	Brooks Farm.
Bullard, Alvan Henry,	South Framingham,	3 North College.
Burby, Lawrence Walter,	Chicopee Falls,	Theta Chi House.
Bursley, Harold Barrows,	Peabody,	5 North College.
Carver, John Stuart,	Roslindale,	C. S. C. House.
Clark, Norman Russell,	Millbury,	Theta Chi House.
Cobb, Joseph Boyd,[1]	Chicopee Falls,	5 North College.
Cole, Arlin Tower,	West Chesterfield,	2 North College.
Cole, Flora Atwood,	Newton,	Draper Hall.
Coleman, Isaac,[1]	Amherst,	12 North College.
Cooper, Everett Hanson,[1]	Greenwood,	11 North College.
Cory, Harold,	Rutherford, N. J.,	15 Beston Street.
Covill, Joseph Warren,[1]	Roxbury,	7 South College.
Cristman, Clyde Edward,[1]	Dalton,	2 North College.
Culley, Frank Hamilton,	Marshalltown, Ia.,	77 Pleasant Street.
Curtis, Harold William,[1]	Belchertown,	Entomology Building.
Daniel, Edward Stephen Coen,	Osterville,	7 South College.
Dayton, James Wilson,	Georgetown, Conn.,	4 North College.
Dooley, Thomas Patrick,	South Boston,	6 North College.
Drury, Lewis Floyd,	Rutland,	120 Pleasant Street.
Edminster, Albert Franklin,	Brooklyn, N. Y.,	5 South College.
Eisenhaure, John Louis,[1]	North Reading,	3 North College.
Ellis, Benjamin Ward,	Plymouth,	Kappa Sigma House.
Ells, Gordon Waterman,	Haverhill,	5 South College.
Fay, Robert Sedgwick,	Monson,	84 Pleasant Street.
Forbush, Wallace Clifford,	Rutland,	79 Pleasant Street.
French, James Dudley,	Hyde Park,	8 South College.
Gaskill, Ralph Hicks,	Amherst,	15 Hallock Street.
Gore, Harold Martin,	Wollaston,	11 South College.
Greenleaf, George Freeman,	Brockton,	21 Fearing Street.
Griggs, Frederick David,	Chicopee Falls,	18 South College.
Harris, Burton Adams,	Wethersfield, Conn.,	11 North College.
Hasey, Willard Harrison,[1]	Campello,	C. S. C. House.
Hatch, Herbert Tilden,	Atlantic,	East Experiment Station.
Headle, Herbert Wallace,	Bolton,	North College.
Headle, Marshall,	Bolton,	French Hall.
Holden, James Loomis,	Palmer,	3 North College.
Howe, Glover Elbridge,	Marlborough,	11 South College.

---

[1] Work incomplete.

Howe, Ralph Wesley,	East Dover, Vt.,	Wilder Hall.
Huntington, Samuel Percy,	Lynn,	12 South College.
Hutchings, Herbert Colby,[1]	South Amherst,	9 North College.
Hyland, Harold Wilson,[1]	Weymouth,	Old Insectary.
Jones, Harold Frederic,	Campello,	West Experiment Station.
Jordan, Simon Miller,[1]	Rutherford, N. J.,	9 South College.
Kelley, Albert Joseph,	Roxbury,	1 North College.
Kelley, Bernard Jenkins,	Harwichport,	Brooks Farm.
Kenney, Frederick Alfred,[1]	Charlestown,	South College Tower.
Lesure, John Warren Thomas,	Fitchburg,	Flint Laboratory.
Little, Willard Stone,[1]	Newburyport,	6 South College.
Lowry, Quincy Shaw,[1]	Canton,	6 South College.
Lundgren, Arthur Robert,[1]	Orange,	Theta Chi House.
Lyon, Harold,	Somerville,	13 Phillips Street.
Macone, Joseph Augustine,	Concord,	4 South College.
Mallett, George Alfred,	Bridgeport, Conn.,	9 North College.
Matz, Julius,[1]	Lynn,	112 Pleasant Street.
Mayer, John Lawrence,	South Boston,	1 North College.
McDougall, Allister Francis,	Westford,	18 South College.
Moir, William Stuart,	Boston,	Theta Chi House.
Murray, Joseph Wilbur,	Holyoke,	Kappa Sigma House.
Neal, Ralph Thomas,	Mattapan,	Old Insectary.
Nichols, Norman Joseph,	Everett,	Physics Building.
O'Brien, James Leo,	Wayland,	10 South College.
Packard, Clyde Monroe,	Springfield,	84 Pleasant Street.
Pease, Lester Newton,	Meriden, Conn.,	17 South College.
Pillsbury, Joseph James,[1]	West Bridgewater,	8 South Prospect St.
Post, George Atwell,[1]	Richmond Hill, N. Y.,	Theta Chi House.
Roehrs, Herman Theodore,	New York, N. Y.,	Kappa Sigma House.
Rosebrooks, Walter Edwin,[1]	Essex,	14 North College.
Samson, Stuart Dodds,	Grand Isle, Vt.,	12 South College.
Selden, John Lincoln,	Northampton,	21 Fearing Street.
Serex, Paul, Jr.,	Jamaica Plain,	14 North College.
Sheehan, Dennis Anthony,[1]	South Lincoln,	1 North College.
Shute, Carl August,[1]	Quincy Ill.,	14 South College.
Streeter, Charles Marsh,	Brimfield,	79 Pleasant Street.
Thayer, Clark Leonard,	Smith's,	8 North College.
Tucker, Waldo Guy,	Lynn,	Physics Building.
Van Zwaluwenburg, Reyer Herman,	Rutherford, N. J.,	17 South College.
Walker, Charles Dexter,	Greenwich Village,	14 South College.
Whitney, Francis Wellington,[1]	Wellesley,	4 North College.
Zabriskie, George, 2d,[1]	New York, N. Y.,	8 South College.

JUNIOR CLASS.

Abbott, Leslie Elmer,	Sandwich,	10 North College.
Allen, Carl Murdough,	Holyoke,	87 Pleasant Street.
Anderson, Leslie Oscar,[1]	Concord,	101 Pleasant Street.
Baker, Warren Sears,	Wollaston,	8 South College.
Black, Harold Cotting,[1]	Falmouth,	Kappa Sigma House.
Blake, Ralph Cedric,[1]	Wollaston,	15 Hallock Street.
Bokelund, Chester Story,[1]	Worcester,	10 South College.
Bradley, John Watling,[1]	Groton,	88 Pleasant Street.
Bragg, Ralph Stanley,	Milford,	Care of Professor White.
Brewer, Harold William,[1]	Mount Vernon, N.Y.,	C. S. C. House.
Brooks, Arthur Winslow,	Enfield,	79 Pleasant Street.
Brown, Harry Dunlap,[1]	Lowell,	Kappa Sigma House.
Calvert, Melville Bradford,	New London, Conn.,	58 Pleasant Street.
Campbell, Malcolm David,	Still River,	Poultry Building.
Christie, Edward Wheeler,	North Adams,	P. O. Box 152.
Churchill, George Clarence,	Worcester,	58 Pleasant Street.
Clark, Ernest Samuel, Jr.,	Tolland,	82 Pleasant Street.

---

[1] Work incomplete.

Clay, Harold Johnson,	North Cambridge,	21 Fearing Street.
Clegg, Frank Jackson,[1]	Fall River,	2 South College.
Coe, Alfred Lynn,	Fayetteville, N. Y.,	79 Pleasant Street.
Cole, Herbert Elmer,[1]	Manchaug,	Plant House.
Coleman, David Augustus,	South Framingham,	108 Pleasant Street.
Davies, Lloyd Garrison,	Peabody,	15 South College.
Davis, Ralph Edward,[1]	Southbury, Conn.,	77 Pleasant Street.
Davis, William Ashmun,	Northfield,	79 Pleasant Street.
Dearing, Newton Howard,[1]	Brookline,	7 Nutting Avenue.
Demond, Robert Norton,	North Adams,	16 South College.
Dexter, Evans King,[1]	Mattapoisett,	Theta Chi House.
Dunbar, Erving Walker,	Weymouth,	116 Pleasant Street.
Edgerton, Almon Morley,[1]	West Springfield,	13 South College.
Edwards, Edward Clinton,[1]	Salem,	16 South College.
Eldridge, Harold Lockwood,[1]	Wareham,	88 Pleasant Street.
Foster, Stuart Brooks,[1]	West Somerville,	Kappa Sigma House.
Freeborn, Stanley Barron,	Ware,	116 Pleasant Street.
Freedman, Samuel Leavitt,	Roxbury,	101 Pleasant Street.
Frye, Carl Raymond,	South Hadley Falls,	116 Pleasant Street.
Fuller, George,	Deerfield,	86 Pleasant Street.
Griffin, William Gerald,	South Hadley Falls,	South Hadley Falls.
Hadfield, Harold Frederick,	North Adams,	East Pleasant Street.
Handy, Ralph Ellis,[1]	Cataumet,	10 North College.
Harris, Rodney Wells,	Wethersfield, Conn.,	77 Pleasant Street.
Hazen, Edward Leonard,[1]	Springfield,	Care of E. H. Forristall.
Hebard, Emory Blodgett,[1]	Fiskdale,	3 Fearing Street.
Heffron, Frederick,	Sherborn,	108 Pleasant Street.
Hogg, Lawrence Jagger,[1]	Lawrence,	Pease Avenue.
Howard, Louis Phillips,	North Easton,	19 Hallock Street.
Hutchinson, John Gouverneur,	Arlington,	15 South College.
Ingham, Earl Morris,	Granby,	86 Pleasant Street.
Jacobs, Loring Humphrey,[1]	Wellesley,	25 Pleasant Street.
Jenney, Herbert Hedge,[1]	South Boston,	6 Nutting Avenue.
Johnson, Rollin Eugene,[1]	Templeton,	120 Pleasant Street.
Jones, Dettmar Wentworth,[1]	Melrose,	66 Pleasant Street.
Leete, Richard Fowler,[1]	Mount Kisco, N. Y.,	81 Pleasant Street.
Levine, Henry Walter,[1]	Roxbury,	101 Pleasant Street.
Lincoln, Murray Danforth,	North Raynham,	19 Hallock Street.
Lucas, Hoyt Dennis,	West Springfield,	1 Allen Street.
Major, Joseph,	Rutherford, N. J.,	58 Pleasant Street.
Marsh, Frank Eugene,	Jefferson,	79 Pleasant Street.
Merkle, Frederick Grover,	Amherst,	North East Street.
Morrison, Harold Ivory,	Melrose,	77 Pleasant Street.
Morse, Harold John,[1]	Townsend,	75 Pleasant Street.
Needham, Lester Ward,[1]	Springfield,	Kappa Sigma House.
Nicolet, Theodore Arthur,[1]	Fall River,	Flint Laboratory.
Nicolet, Tell William,	Fall River,	C. S. C. House.
Nissen, Harry,	Boston,	85 Pleasant Street.
Norton, Leslie Howard,	Newport, R. I.,	79 Pleasant Street.
Nute, Raymond Edson,	Fall River,	9 Fearing Street.
Oertel, John Thomas,[1]	South Hadley Falls,	116 Pleasant Street.
Parker, Ervine Franklin,	Poquonock, Conn.,	Kappa Sigma House.
Payne, Roland Alfred,	Wakefield,	North Amherst.
Pellett, John Doubleday,	Worcester,	16 North College.
Peters, Chester Harry,	Brown's Station, N. Y.,	116 Pleasant Street.
Petersen, Peveril Oscar,[1]	Concord,	9 Fearing Street.
Porter, Bennett Allen,	Amherst,	Hatch Barn.
Powers, Richard Henry,[1]	Malden,	Veterinary Laboratory.
Read, Frederick William,[1]	Boston,	Telephone, Amherst, 380.
Reid, George Alexander,	Worcester,	Care of E. M. Dickinson.
Russell, Alden Hesseltine,	Watertown,	116 Pleasant Street.
Sahr, Gabriel Arthur,[1]	Boston,	15 Phillips Street.

---

[1] Work incomplete.

Sherman, Joel Powers,	Hyannis,	9 South College.
Shirley, John Newton,	South Duxbury,	30 North Prospect Street.
Small, Francis Willard,[1]	North Truro,	120 Pleasant Street.
Smith, Leon Edgar,	Boston,	2 South College.
Smith, Leone Ernest,	Leominster,	116 Pleasant Street.
Stevens, Arthur Eben,	Brockton,	Beta Kappa Phi House.
Strange, Sarah Josephine,	Marshfield,	Draper Hall.
Tarbell, Munroe Gifford,[1]	Brimfield,	10 North College.
Taylor, Arthur Wright,	Feeding Hills,	3 Nutting Ave.
Taylor, Leland Hart,	Peabody,	13 South College.
Thurston, Arthur Searle,	Everett,	9 Fearing Street.
Tower, Alfred Leigh,	Sheffield,	120 Pleasant Street.
Upton, Ernest Franklin,	Salem,	Care of R. J. Watts.
Walker, Nathaniel Kennard,	Malden,	16 North College.
Walker, Raymond Philip,	Taunton,	83 Pleasant Street.
Warner, Raymond Winslow,	Sunderland,	77 Pleasant Street.
Webster, Louis Armstrong,	Blackstone,	82 Pleasant Street.
Weigel, Arthur George,	Lawrence,	Care of Captain Martin.
Wheeler, Chester Eaton,	Lowell,	87 Pleasant Street.
Whidden, Burton Clark,[1]	Townsend,	81 Pleasant Street.
Whippen, Charles Warren,	Lynn,	13 Phillips Street.
Wing, John Govan,[1]	Somerville,	116 Pleasant Street.
Wood, Henry Joseph,	Mendon,	82 Pleasant Street.

Sophomore Class.

Alden, Charles Harold,[1]	Amherst,	East Pleasant Street.
Allen, Francis Ellwood,	Melrose,	10 Allen Street.
Anderson, Herbert Henry,	Ware,	19 Pleasant Street.
Archibald, Herbert Hildreth,	Waltham,	Care of R. J. Watts.
Baird, Earle Fairbank,[1]	Waltham,	15 Beston Street.
Banister, Seth Warrener,	Westford,	14 Nutting Avenue.
Bartlett, Emory Haynes,[1]	Enfield,	12 Cottage Street.
Bartlett, Edward Russell,	Newburyport,	66 Pleasant Street.
Bartley, Hastings Newcomb,[1]	Sandwich,	66 Pleasant Street.
Bemis, Willard Gilbert,[1]	North Brookfield,	12 Cottage Street.
Bennett, John Ingram,	Boston,	66 Pleasant Street.
Bishop, Chester Allen,[1]	Peterboro, N. H.,	C. S. C. House.
Boyer, Edward Everett Hale,[1]	Lynn,	67 East Pleasant Street.
Braley, Merton Loring,	Rock,	52 Amity Street.
Bronson, Harold Julius,	Buckland,	Brooks Farm.
Brooks, Gardner Milton,	Newton,	8 Allen Street.
Buell, Frank Weed,[1]	Brooklyn, N. Y.,	83 Pleasant Street.
Buttrick, John Willard,	Melrose,	16 Nutting Avenue.
Cale, Gladstone Hume,[1]	West Springfield,	79 Pleasant Street.
Callard, John Case,[1]	Winthrop,	Care of President Butterfield.
Cande, Donald Hopkins,[1]	Pittsfield,	87 Pleasant Street.
Chase, Alexander Baxter, Jr.,	West Barnstable,	Clark Hall.
Churchill, Chester Albert,[1]	Brockton,	18 Nutting Avenue.
Clark, Ellis Fred,	Granby, Conn.,	Theta Chi House.
Clark, Saxon Dickinson,	Springfield,	19 Phillips Street.
Cleveland, Waldo Atwood,	Baldwinsville,	14 Nutting Avenue.
Clough, Maurice Joseph,	Needham,	84 Pleasant Street.
Dalrymple, Andrew Campbell,	Revere,	3 McClellan Street.
Damon, Leon Blanchard,	Melrose,	Nutting Avenue.
Day, George Allen,	Warren,	12 Cottage Street.
Dole, Sumner Alvord,	Bardwell's Ferry,	79 Pleasant Street.
Donnell, George Edwin,	Burlington,	East Experiment Station.
Doran, William Leonard,	North Dartmouth,	Plant House.
Draper, Earle Sumner,	Milford,	C. S. C. House.
Farrar, Stuart Kittridge,	Springfield,	Kappa Sigma House.
Fitzgerald, Daniel James,[1]	Worcester,	75 Pleasant Street.

---

[1] Work incomplete.

Flebut, Alpha John,	Amherst,	27 McClellan Street.
Frost, Robert Theodore,	New York, N. Y.,	C. S. C. House.
Fuller, Richard,	Salem,	West Experiment Station.
Gare, Edward John, Jr.,[1]	Northampton,	13 Phillips Street.
Goodwin, Malcolm Noyes,	Newburyport,	Kappa Sigma House.
Graham, Lucius Henry,[1]	Boston,	Pleasant Street, care of Mrs. Clutia.
Grant, Harold Davidson,	Methuen,	3 McClellan Street.
Grebin, Mark Anthony,[1]	North Hadley,	North Hadley.
Griggs, Raymond Bradford,[1]	Chicopee Falls,	84 Pleasant Street.
Hall, George Morris,	Brookline,	31 East Pleasant Street.
Hall, Roderick Chesley,	Worcester,	79 Pleasant Street.
Harper, James Edward,	New Haven, Conn.,	Kappa Gamma Phi House.
Harper, Raymond Wires,	Barre,	94 Pleasant Street.
Harvey, Russell Wilton,[1]	Lanesville,	44 Pleasant Street.
Haskell, Willis Henry, Jr.,[1]	Brooklyn, N. Y.,	116 Pleasant Street.
Hatfield, William Hollis,	Wellesley,	87 Pleasant Street.
Hathaway, Isaac,[1]	Kingston,	96 Pleasant Street.
Hildreth, Paul Hughes,[1]	Newtonville,	8 Allen Street.
Hill, Charles Chase,[1]	Melrose Highlands,	Pease Avenue.
Hotis, Ralph P.,	Evans Mills, N. Y.,	20 Amity Street.
Hyde, George Frederic,	North Dana,	79 Pleasant Street.
Hyde, Harold Gilmore,	Winchendon,	36 North Prospect Street.
Johnson, Arthur,	Bridgeport, Conn.,	12 South College.
Jordan, Perley Balch,[1]	Topsfield,	15 Beston Street.
Kelleher, Jerome Joseph.	Montague City,	75 Pleasant Street.
Kennedy, Thomas James,	South Hadley Falls,	35 East Pleasant Street.
Kennedy, Worthington Chester,	Hardwick,	101 Pleasant Street.
Koplovitz, Samuel,	Chelsea,	29 Lincoln Avenue.
Lane, Merton Chesleigh,	South Duxbury,	Care of L. A. Root.
LeDuc, Ashley Cudworth,[1]	Chesterfield,	19 Pleasant Street.
Lewis, Daniel James,	Hanson,	Kappa Sigma House.
Lewis, John Kirby,[1]	New Haven, Conn.,	Care of E. M. Dickinson.
Lincoln, Irving Boin,[1]	Glens Falls, N. Y.,	Care of President Butterfield.
Little, Harold Greenleaf,[1]	Newburyport,	Kappa Sigma House.
Lovejoy, John Sumner,	Newburyport,	53 Lincoln Avenue.
MacNeil, Ralph Langdel,	Chelsea,	21 Amity Street.
Macy, Philip Arthur,	Oak Bluffs,	53 Lincoln Avenue.
Marsh, Franklin Winter,	Amherst,	16 Nutting Avenue.
Marsh, Herbert Verner,	Deerfield,	79 Pleasant Street.
Masse, Sidney Merton,	Dorchester,	3 McClellan Street.
McKechnie, Ray Farrar,	Natick,	5 McClellan Street.
McLain, Ralph Emerson,	Melrose,	66 Pleasant Street.
Melican, George Deady,[1]	Worcester,	66 Pleasant Street.
Melloon, Ralph Reid,[1]	Lowell,	Kappa Sigma House.
Moberg, Eldon Samuel,	Campello,	18 Nutting Avenue.
Montague, Enos James,	Northampton,	13 Phillips Street.
Moore, Roger Henry,	Beverly,	66 Pleasant Street.
Navas, Miguel,[1]	Barranquilla, Col., S. A.,	120 Pleasant Street.
O'Brien, Daniel William,[1]	Wayland,	New Apiary.
Parker, Edwin Kenney,[1]	Northampton,	77 South Pleasant Street.
Parmenter, Ernest Brigham,[1]	Dover,	79 Pleasant Street.
Patten, Merrill Campbell,	Brighton,	31 East Pleasant Street.
Patterson, Robert Earley,	Dorchester,	75 Pleasant Street.
Pendleton, Harlow Libby,[1]	Dorchester,	16 Nutting Avenue.
Perry, Gerald Eugene,	Amherst,	Prospect House.
Pike, Joseph Stevens, Jr.,	Somerville,	3 Nutting Avenue.
Potter, George Raymond,[1]	Ludlow,	44 Pleasant Street.
Price, James Albert,	New York, N. Y.,	15 Beston Street.
Rhoades, Paul Whitney,	Malden,	2 Allen Street.
Rogers, Harold Merriman,	Southington, Conn.,	87 Pleasant Street.
Sauchelli, Vincent,	Waterbury, Conn.,	11 High Street.

---

[1] Work incomplete.

Scott, Lincoln Bain,[1]	Melrose,	3 McClellan Street.
Sears, William Richard,	Arlington,	84 Pleasant Street.
Severance, Verne Lincoln,	South Hanson,	Care of L. A. Root.
Sherman, Milton Francis,	South Lincoln,	10 Allen Street.
Simon, Isaac Barney,[1]	Revere,	38 Cottage Street.
Slein, Owen Francis,	New Braintree,	127 South Pleasant Street.
Smith, Himan,[1]	Worcester,	8 Allen Street.
Spofford, Chester Porter,	Georgetown,	5 McClellan Street.
Strauss, Abraham,[1]	Boston,	101 Pleasant Street.
Taft, Richard Craig,[1]	Oxford,	84 Pleasant Street.
Tarr, Lester Winslow,[1]	Rockport,	44 Pleasant Street.
Tonry, Albert Joseph Paul,[1]	Winthrop,	Durfee Plant House.
Tower, Ralph Ernest,	Becket,	120 Pleasant Street.
Tower, William Reginald,	Sheffield,	94 Pleasant Street.
Towne, Edwin Chester,[1]	Waltham,	C. S. C. House.
Upton, Raymond Melville,	Peabody,	87 Pleasant Street.
Vener, Benjamin,	Brockton,	38 Cottage Street.
Vinal, Stuart Cunningham,	East Weymouth,	9 Allen Street.
Wellington, Benjamin,	Waltham,	10 Allen Street.
White, Homer Beethoven,	Melrose,	10 Allen Street.
White, Henry Harrison,	West Peabody,	79 Pleasant Street.
Whitmore, Philip Ferry,	Sunderland,	13 Phillips Street.
Whorf, Paul Francis,	Hyde Park,	87 Pleasant Street.
Wilkins, Alfred Emerson,	Wakefield,	116 Pleasant Street.
Willey, Harold Cleland Clancy,	Orange,	Care of E. F. Gaskill.
Williams, Donald,	Catasauqua, Pa.,	C. S. C. House.
Woodman, Edward, Jr.,[1]	Portland, Me.,	15 Gaylord Street.
Wright, Elvin Stanley,	Worcester,	15 Fearing Street.

Freshman Class.

Aiken, Harold,	Millis,	29 McClellan Street.
Allen, Chester King,	Quincy,	Brooks Farm.
Anderson, Frank Albert,[1]	Somerville,	13 Phillips Street.
Andrews, Francis Marshall, Jr.,	Manchester,	53 Lincoln Avenue.
Barnes, Fred Leslie,	Plymouth,	7 Nutting Avenue.
Bean, Harold John,[1]	Haverhill,	Care of E. F. Gaskill.
Beeler, Leon Charles,[1]	Adams,	75 Pleasant Street.
Bishop, Herbert Walker,[1]	Doylestown, Pa.,	C. S. C. House.
Bisbee, Philip Emerson,	Waitsfield, Vt.,	East Pleasant Street.
Blanpied, Nelson Uhler,	Framingham,	Care of Mr. Forristall.
Bradley, William George,	Groton,	31 East Pleasant Street.
Brazil, William Henry,	Leominster,	116 Pleasant Street.
Brush, David Carey,	Vineyard Haven,	19 Phillips Street.
Burnham, Chester Arthur,	Westford,	Brooks Farm.
Burt, Warner Howard,	Longmeadow,	6 Nutting Avenue.
Caldon, John Jeremiah,	West Springfield,	– –
Caldwell, Harold Nute,	Lowell,	3 Nutting Avenue.
Cardarelli, Emilio Joseph,	Boston,	31 North Prospect Street.
Carruth, Glenn Howard,	Orange,	34 North Prospect Street.
Carver, Frank Whitney,	Plymouth,	7 Nutting Avenue.
Cate, Rex March,	Canton,	3 Nutting Avenue.
Chamberlin, Raymond,	Rutherford, N. J.,	82 Pleasant Street.
Chisholm, Raymond Lincoln,	Melrose Highlands,	66 Pleasant Street.
Choate, Carlisle Edward,	Boston,	15 Phillips Street.
Clapp, Raymond Luckey,[1]	Northfield,	Brooks Farm.
Clough, Charles Henry,	Dedham,	35 East Pleasant Street.
Cobban, Donald Stickney,[1]	Groveland,	Mt. Pleasant.
Coleman, Albert Sumner,	Mendon,	15 Hallock Street.
Coley, William Stanton,	Wilton, Conn.,	36 North Prospect Street.
Courchene, Alcide Telesphor,[1]	North Adams,	14 Nash Block.
Curran, Harry Ambrose,	Marlborough,	Taylor Farm.

---

[1] Work incomplete.

Curtin, Charles Warren,	Auburndale,	15 Hallock Street.
Cushing, Raymond Alonzo,	Somerville,	13 Phillips Street.
Danforth, George Newlan,	Foxcroft, Me.,	82 Pleasant Street.
Davis, Frank Leslie,	South Hopedale,	Care of E. F. Gaskill.
Dickinson, William Cowls,	North Amherst,	North Amherst.
Dine, Hyman Bertram,	Boston,	35 South Pleasant Street.
Dinsmore, Donald Sanderson,	Springfield,	6 Nutting Avenue.
Doggett, William Henry,[1]	Dedham,	35 East Pleasant Street.
Doherty, Paul Edward,[1]	Fall River,	East Pleasant Street.
Duffill, Edward Stanley,[1]	Greenwood,	Care of L. A. Root.
Dumas, Walter Branca,[1]	Boston,	35 East Pleasant Street.
Dunbar, Henry Hart,	Taunton,	83 Pleasant Street.
Edwards, Maurice Millett,	Lawrence,	25 Pleasant Street.
Eldredge, Raymond Chase,	No. Abington,	30 North Prospect Street.
Eldridge, Clarence Crocker,	Natick,	52 Lincoln Avenue.
Epstein, Harry Browdy,	Amherst,	38 Cottage Street.
Fernald, Charles Henry,	Amherst,	44 Amity Street.
Fielding, Lester Edward,	Malden,	2 Allen Street.
Fisher, George Basil,	Millbury,	Care of E. F. Gaskill.
Fox, Edward Lawrence,[1]	Winthrop,	29 McClellan Street.
Francis, Charles Davis,	Cranford, N. J.,	25 Pleasant Street.
Gaventa, Harry Reymer,	Repaupo, N. J.,	35 East Pleasant Street.
Gilmore, Benjamin Anthony,	Acushnet,	40 Amity Street.
Gioiosa, Alfred Anthony,	Dorchester,	Brooks Farm.
Glover, Theodore Whitford,	South Duxbury,	Care of L. A. Root.
Goodwin, Clinton Foster,	Haverhill,	7 Nutting Avenue.
Googins, Burton,	Brooklyn,	52 Lincoln Avenue.
Gordon, Lewis Sanford, Jr.,	Clinton,	Care of Dr. Gordon.
Gould, Charles Holt,[1]	Worcester,	66 Pleasant Street.
Graves, Ralph Wheeler,	Shelburne Falls,	40 Amity Street.
Gray, Frank Lyman,	Shelburne Falls,	North Amherst.
Gunn, Carlton Merrick,	Sunderland,	3 Nutting Avenue.
Hager, Clayton Marden,	Somerville,	3 Nutting Avenue.
Hall, Stanley William,	Saxonville,	Brooks Farm.
Harlow, Nathaniel Luzerne,[1]	Amherst,	7 Parsons Street.
Harriman, Chester Karl,	Exeter, N. H.,	36 North Prospect Street.
Harris, William Lombard, Jr.,	Deerfield,	53 Lincoln Avenue.
Harrocks, Thomas Lincoln,	Westminster,	36 North Prospect Street.
Hart, Reginald,	Montague City,	53 Lincoln Avenue.
Haskell. Frank Eugene,	Northborough,	Care of C. R. Greene.
Hathaway, Charles Edward,	Somerset,	19 Phillips Street.
Hemenway, Justin Stanley,	Williamsburg,	Brooks Farm.
Hendry, Arthur Ekman,[1]	Mattapan,	16 Nutting Avenue.
Hobart, Ralph Edmund,	North Amherst,	North Amherst.
Holden, Mae Faustina,	Royalston,	Care of President Butterfield.
Hulsizer, Allan Lynne,	Flemington, N. J.,	29 North Prospect Street.
Hunt, Reginald Stuart,	Bridgewater,	53 Lincoln Avenue.
Huntington, Charles Albert, Jr.,	Poquonock, Conn.,	82 Pleasant Street.
Jenna, William Wallace,[1]	Athol,	116 Pleasant Street.
Jerome, Frederick William,[1]	Stockbridge,	40 Amity Street.
Jones, Linus Hale,	Milford,	Care of C. R. Greene.
Kaplan, Barney,	Malden,	38 Cottage Street.
Keegan, Frank Champion,[1]	Turners Falls,	75 Pleasant Street.
Keegan, Thomas Michael,[1]	Worcester,	75 Pleasant Street.
Kelly, Harold Russell,	Haverhill,	15 Gaylord Street.
Kennedy, George William,	Sayville, L. I.,	7 Nutting Avenue.
Kilbon, Ralph Gillette,[1]	Springfield,	Brooks Farm.
King, Edward Lee,	Dorchester,	Brooks Farm.
Kinsman, Alfred Oberlin, Jr.,	Merrimac,	– –
Kitsis, Henry Hyman,[1]	Boston,	41 Pleasant Street.
Knapton, Guy Lord,	Lawrence,	Pease Avenue.
Laird, Kenneth Bradford,	Brockton,	36 North Prospect Street.

---

[1] Work incomplete.

Lamoureux, Domina Joseph,	Adams,	75 Pleasant Street.
Lehman, Walter Ernest,	Worcester,	East Pleasant Street.
Lieber, Conrad Hugo,[1]	Jamaica Plain,	31 North Prospect Street.
Lindquist, Albert Evert,[1]	Jamaica Plain,	5 McClellan Street.
Locke, Wilbur Trow,	Lawrence,	25 Pleasant Street.
Lyford, Waldo Preston,	Natick,	52 Lincoln Avenue.
MacDonald, Norman Duncan,	Melrose,	College Store.
Mahony, William John,	Winthrop,	29 McClellan Street.
Mann, Victor Leslie,	Millers Falls,	13 Phillips Street.
Marshall, Earl LeForest,	Neponset,	Hadley.
Mattoon, Harold Gleason,	Pittsfield,	87 Pleasant Street.
Maynard, Harlan Slade,[1]	Jefferson,	Care of R. J. Goldberg.
McCulloch, Norman Estes,	Pawtucket, R. I.,	Care of Professor Morton.
Meade, Joseph Williams,[1]	West Springfield,	Care of Mrs. Hill, Nutting Avenue.
Mimitz, Joseph Raymond,[1]	Hadley,	Hadley.
Montgomery-Peter, Thomas M.,	Philadelphia, Pa.,	15 Phillips Street.
Mooney, Raymond A.,[1]	Plattsburgh, N. Y.,	12 Hallock Street.
Morton, Walter Joseph,[1]	Jamaica Plain,	Care of Mrs. Gibbs.
Moses, Charles Wicker,	Ticonderoga, N. Y.,	7 Nutting Avenue.
Moss, Earle Chester,[1]	Worcester,	Care of Mrs. Gibbs.
Mostrom, Harold Augustus,	Somerset,	36 North Prospect Street.
Murphy, John William,	Beverly,	15 Beston Street.
Nash, Clayton Wells,	South Weymouth,	7 Nutting Avenue.
Nestle, William John,[1]	Amherst,	Amherst.
Nicholson, James Thomas,	Leominster,	116 Pleasant Street.
Noyes, Samuel Verne,[1]	Georgetown,	36 North Prospect Street.
O'Brion, Edwin Fulton,	Somerville,	83 Pleasant Street.
Oertel, August Leonard,[1]	South Hadley Falls,	South Hadley Falls.
Palmer, George Bradford,	Brookline,	Care of E. F. Gaskill.
Phelps, Sanford Wallace,	Turners Falls,	35 East Pleasant Street.
Pierce, James Dwight,[1]	Springfield,	Care of E. H. Forristall.
Plaisted, Philip Asbury,	Arlington,	77 Pleasant Street.
Porter, Philip Clayfield,	West Springfield,	79 Pleasant Street.
Potash, Philip,[1]	Boston,	35 South Pleasant Street.
Potter, David,	Concord,	40 Amity Street.
Pratt, Walter Howard,	Dalton,	Hallock Street and Pease Avenue.
Prouty, Stanley Marshall,	North Brookfield,	12 Cottage Street.
Quincy, Knight,	Roslindale,	35 East Pleasant Street.
Randall, Denton William,	Somerville,	– –
Ray, George Burrill,	Hingham,	Brooks Farm.
Reed, Andrew John, Jr.,	Dalton,	Pease Avenue.
Rendall, Raymond Eaton,	Melrose,	College Store.
Rich, Gilbert Warren,	Hingham,	8 Allen Street.
Richards, Everett Stackpole,	Northampton,	Northampton.
Richardson, Lewis Elmer,	Millis,	29 McClellan Street.
Ricker, Dean Albert,	Worcester,	C. S. C. House.
Rogers, Roland Winsor,[1]	Roxbury,	25 Lincoln Avenue.
Rogers, Tyler Stewart,	Saxonville,	Care of Mr. Forristall.
Rowe, Louis Victor,[1]	Melrose,	18 Nutting Avenue.
Russell, Ernest Samuel,	Hadley,	Hadley.
Ryan, William Edward, Jr.,[1]	Stoughton,	7 Nutting Avenue.
Sanderson, Everett Shovelton,	Centreville, R. I.,	19 Phillips Street.
Saunders, William Putnam,	Lawrence,	1 Allen Street.
Sauter, William Hugo,[1]	Turners Falls,	75 Pleasant Street.
Scheufele, Frank Joseph,	South Natick,	52 Lincoln Avenue.
Schlotterbeck, Lewis,[1]	Roxbury Station, Conn.,	12 Hallock Street.
Schwartz, Louis,	Melrose,	38 Cottage Street.
Shapiro, Frank Simon,	Lynn,	41 Pleasant Street.
Sherinyan, Suran Donald,	Worcester,	Care of Mrs. Taylor, North Amherst.

---

[1] Work incomplete.

Simmons, Perez,[1]	Pittsfield,	36 North Prospect Street.
Smith, Horace Arthur,[1]	Newtown, Conn.,	Care of Mrs. Gibbs.
Smith, Philip Laurence,	Kingston,	Care of Mrs. Gibbs.
Stanford, Ernest Elwood,	Rowe,	71 South Pleasant Street.
Stearns, Frederick Campbell,	Waltham,	40 Amity Street.
Stone, Albert Edwin,[1]	Worcester,	Brooks Farm.
Stoughton, Richard,	Montague,	21 Fearing Street.
Swan, Durelle,	Dorchester Centre,	Care of Professor Morton.
Swift, Raymond Walter,	North Amherst,	North Amherst.
Taber, Ralph Fred,	Phoenix Mills, N. Y.,	77 Pleasant Street.
Tarbell, Herbert Hitchcock,[1]	Warren,	12 Cottage Street.
Taylor, Howell,[1]	Florida, N. Y.,	7 Nutting Avenue.
Topham, Alfred,	Lawrence,	31 East Pleasant Street.
Treat, Rutherford Sperry,	Seymour, Conn.,	7 Nutting Avenue.
Upham, Thomas Carlton,	Fitchburg,	15 Hallock Street.
Verbeck, Howard Graves,[1]	Malden,	Care of C. R. Greene.
Walkden, Herbert Haldon,	Westford,	Brooks Farm.
Walker, Henry Marshall,	South Harwich,	Brooks Farm.
Walker, Robert Russell,	Mansfield,	– –
Warner, Lewis Pomeroy,[1]	Sunderland,	3 Nutting Avenue.
Webster, Frank Cedric.	Harvard,	35 East Pleasant Street.
Weisbein, Isaac,	Brooklyn, N. Y.,	Care of L. A. Root.
Wells, Harry Andrew,	Dalton, Pa.,	5 McClellan Street.
Wentworth, Everett Lawrence,	East Dover, Vt.,	30 North Prospect Street.
Wetherbee, Raymond Scott,	Waltham,	35 East Pleasant Street.
Wheeler, Chester Warren,	Southborough,	28 Northampton Road.
Wheeler, Robert Kellogg,	Great Barrington,	40 Amity Street.
Whitney, Leon Fradley,	Brooklyn, N. Y.,	52 Lincoln Avenue.
Whitney, Harold Tichenor,	Mt. Vernon, N. Y.,	C. S. C. House.
Wies, Calmy,[1]	Malden,	38 Cottage Street.
Wilcox, Timothy Palmer,	Andover,	83 Pleasant Street.
Wildon, Carrick Earl,	Melrose,	66 Pleasant Street.

UNCLASSIFIED STUDENTS.

Bates, L. Emeline,	Billerica,	Draper Hall.
Blackhall, Allan John,	Brookline,	Care of Professor Morton.
Cann, Fred Hodges,	Beverly,	44 Triangle Street.
Cannon, Thomas Vincent,	Newton,	77 Pleasant Street.
Chambers, Maude Burdick,	Harper's Ferry, W. Va.,	8 Allen Street.
Comeau, Mark Walter,	Maynard,	19 Pleasant Street.
Crosby, Stanley,	Warren,	Theta Delta Chi House.
Dearth, Newman,	Ashland,	35 East Pleasant Street.
Dillon, Thomas Stevenson,	West Warren,	101 Pleasant Street.
Dodd, Dexter Tiffany,	Chestnut Hill,	83 Pleasant Street.
Dodge, Walter Eugene,	Geneva, O.,	14 South College.
Fiske, Howard Benjamin,	Passaic, N. J.,	Care of Professor White.
Fitzgerald, William Patrick,	Worcester,	75 Pleasant Street.
Fox, Everett Bailey,	Dracut,	3 Nutting Avenue.
Hicks, Albert James,	Northfield,	Brooks Farm.
Hooper, Edward Asa,	Chestnut Hill,	36 North Prospect Street.
Kendall, Edward Dana,	Holden,	Brooks Farm.
Lockwood, Dimon,	Boston,	Prospect House.
Malkasian, Nishan P.,	Boston,	– –
MacCormac, Wm. Frederic,	Malden,	Brooks Farm.
Mott, Percival,	Cambridge,	81 Pleasant Street.
Nixon, William Joseph,	Boston,	101 Pleasant Street.
Pease, Willard Noah Morris,	Altoona, Pa.,	Brooks Farm.
Perry, Edgar Adams,	Attleborough,	35 East Pleasant Street.
Prouty, LeRoy Fletcher,	Rockland,	31 North Prospect Street.
Rae, George Little,	Needham Heights,	2 Allen Street.
Richards, Edwin Henry,	Hartford, Conn.,	2 Allen Street.

---

[1] Work incomplete.

Ridlon, Ernest Tarr,	Chelsea,	15 Gaylord Street.
Taylor, Frank Reed,	Frye, Me.,	30 North Prospect Street.
Willard, Harold Nelson,	Baltimore, Md.,	81 Pleasant Street.
Winkler, Alfred,	Hackensack, N. J.,	44 Triangle Street.

SHORT COURSES.

Ten Weeks' Registration.

Abbot, Mary Perkins,	5 Marlboro Street, Boston.
Allen, Walter J.,	Box 76, Berlin.
Badger, Jos. J.,	Hudson.
Baker, Chas. L.,	8 St. James Street, Boston.
Baldwin, Chas. H.,	75 Pearl Street, Boston.
Barker, Bowen,	85 Forest Hills Street, Jamaica Plain.
Barnard, Ernest K.,	Grasmere, N. H.,
Bartlett, Allen J.,	Lenox.
Bates, Harold,	Oxford.
Bigelow, Jos. S., Jr.,	Cohasset.
Bittinger, Fritz John,	Plymouth.
Blodgett, W. K.,	South Lincoln.
Borden, Aulrey W.,	South Framingham.
Boyd, Gardner,	Dedham.
Bresth, Samuel,	West Acton.
Brewer, Leon Arthur,	Berlin.
Browne, W. Prichard,	New York City.
Caldwell, Delmont,	Dorchester.
Campbell, Ronald,	Wayland.
Cartier, Frank J.,	Mittineague.
Chapman, Mortimer,	Richmond.
Chase, Chas. S.,	Foxborough.
Clary, Dennis J.,	Holyoke.
Coffin, Paul S.,	Boston.
Colburn, Edw.,	New Boston, N. H.
Cole, Harold W.,	Greenbush.
Condon, E. F.,	Great Barrington.
Cooley, Elbert,	New York.
Cooper, Herbert M.,	Interlaken.
Cotton, Harvey,	Brighton.
Crowley, Jos.,	Cushman.
Cushman, Julian H.,	Bernardston.
Dale, Fred,	Manchester.
Davis, H. W.,	Greenfield.
Davis, Walter H.,	Amherst.
Davison, Geo. E.,	Malden.
Deady, Nona E.,	South Boston.
Decatur, Jos. H.,	Wayland.
Easterbrook, I. H.,	Dudley.
Eastman, Harold,	South Lyndeboro, N. H.
Farrar, A. D.,	Amherst.
Feeney, John, Jr.,	Westford.
Fiebiger, Peter,	Weehawken, N. J.
Fisher, Walter H.,	Barre.
Fisher, E. J.,	Falmouth.
Ford, Earl Jay,	Stockbridge.
Francis, Benj. A.,	Rock.
Freeman, Jos. O.,	Dana.
French, Mrs. Mary B.,	Acworth, N. H.
Gleason, Ray E.,	Dell.
Gopan, Sylvester,	Tarrytown, N. Y.
Greene, Maurice N.,	Amherst.
Groff, Julya,	Amherst.
Grosvenor, Wm. H.,	Auburn.
Gummow, Earl,	Halifax.
Hakes, Chauncey,	Stockbridge.

Hall, C. John,	Milton.
Harris, Myron A.,	Farmington, Conn.
Hawks, Paul,	Deerfield.
Hendrickson, M. Louise,	Pittsfield.
Holbrook, Lewis,	Brooks' Farm, Amherst.
Howes, Leon G.,	Watson.
Ihmsen, Chas. B.,	Providence, R. I.
Imlay, Manning P.,	Zanesville, O.
Jenks, E. Lawrence,	Adams.
Johnson, Raymond F.,	North Grafton.
Jordan, Earl W.,	West Newbury.
Jones, Chapin,	Tufts College.
Judd, Robt. S.,	South Hadley.
Kendall, E. Dana,	Holden.
Kentfield, John T.,	Amherst.
Lathe, Martha L.,	Newton.
Lawrence, Wm. G.,	Lincoln Street, Hudson.
Leach, C. Arthur,	South Hamilton.
Leithauser, G. C.,	Bloomfield, N. J.
Lerner, Rose,	Peru.
Lillie, Walter P.,	Peace Dale, R. I.
Macken, Michael,	Glendale.
Manton, Geo., Jr.,	Eglinton, Ont.
Martell, Jos. A.,	Southbridge.
McGill, Edg. J.,	Beverly.
McGregor, Frank,	Newburyport.
Mead, Harlow E.,	North Andover.
Melloon, Ralph Reid,	Lowell.
Messerli, R. A.,	West Andover.
Mezit, Peter,	Damascus, Va.
Moyle, John, Jr.,	Groton.
Nash, Henry C.,	Amherst.
Newton, Lola J.,	West Brattleboro, Vt.
Newton, R. Alb.,	West Brattleboro, Vt.
North, John,	Richmond.
O'Connor, Raymond L.,	Jamaica Plain.
Paley, Israel,	Colchester, Conn.
Palmer, Florence E.,	Chestnut Hill.
Parker, Priscilla,	100 Blue Hills, Hartford, Conn.
Paulson, Jos. W.,	Meadowwood Farms, Cazenovia, N. Y.
Pearson, Edw.,	Fairhaven.
Pease, Clarence A..	Meriden, Conn.
Poor, Benj. P.,	North Andover.
Prentice, Mrs. I. S.,	Springfield.
Prentice, I. S.,	Springfield.
Prescott, E. Clyde,	Westford.
Putnam, Earl F.,	Easthampton.
Priest, Karlton K.,	Littleton.
Reed, Frank H.,	Greenwich, Conn.
Rosen, Morris,	Brockton.
Sabine, Stephen W.,	Brookline.
Sanford, Earle,	Springfield.
Simmons, Geo. Slate,	Brooklyn, N. Y.
Simmons, G. W.,	Amherst.
Shaylor, F. W.,	Lee.
Smith, E. Parker,	Holliston.
Smith, John A.,	South Westport.
Snow, Linus A.,	Windsor, Conn.
Snow, Inez J.,	Windsor, Conn.
Story, Myron,	Chester.
Talbot, H. S.,	South Hadley.
Tate, Raymond C.,	Monterey.
Tufts, Wm.,	Boston.

Turner, Harvey,	North Reading.
Walker, Raymond,	Greenwich Village.
Wall, Geo. W.,	Chester, Pa.
Warburton, Chatterton, Jr.,	Fall River.
Webber, Harold T.,	Winchester.
Wetmore, C. Inglis,	Wollaston.
Wheeler, Caleb H.,	Concord.
Whitby, Lawrence,	Northborough.
Wilson, Wm. F.,	Orford, N. H.
Wiswall, Geo. W.,	Newton Centre.
Wiswall, Ralph A.,	Newton Centre.
Worthen, Stewart,	Mittineague.

Apple Packing School.

Abbot, M. P.,	Boston.
Bigelow, Jos. S., Jr.,	Cohasset.
Boyd, Gardner,	Dedham.
Brown, F. Howard,	Marlborough.
Browne, W. P.,	New York City.
Clark, Winslow,	Shoreham, Vt.
Cobb, Geo. R.,	Kingston, R. I.
Colburn, Edw. N.,	New Boston, N. H.
Cole, Harold W.,	Greenbush.
Condon, C. F.,	Great Barrington.
Critchett, E. R.,	Amherst.
Crocker, B.,	Morristown, N. J.
Davenport, S. L.,	North Grafton.
Dickson, Walter A.,	Harvard.
Easterbrook, I. H.,	Dudley.
Granger, Helen,	Griswoldville.
Green, C. R.,	Belchertown.
Kendall, E. D.,	Holden.
Leach, C. Arthur,	South Hamilton.
Lord, W. E.,	Newfield, Me.
McGill, Edg. J.,	Beverly.
Mead, H. E.,	North Andover.
Messerli, R. A.,	West Andover.
Munson, Wm. A.,	Littleton.
Paul, R. A.,	Framingham.
Paulson, J. W.,	Cazenovia, N. Y.
Prentice, I. S.,	Springfield.
Putnam, E. F.,	Easthampton.
Reynolds, L. J.,	Greenwich, Conn.
Rogers, Geo. L.,	North Wilbraham.
Sabin, Leroy C.,	Ipswich.
Sabine, S. W.,	Brookline.
Shattuck, Mrs. B. B.,	West Acton, Mass.
Taylor, E. R.,	Stow, Mass.
Tufts, Wm.,	Boston.
Walker, R. C.,	Greenwich, Conn.
Wallace, Wm. N.,	Amherst.
Webber, H. T.,	Winchester.
Wheeler, C. N.,	Concord.
Whitby, L. H.,	Northborough.

Beekeeping Course.

Belleville, W. E.,	South Chelmsford.
Churchill, Clarence,	Lynn.
Dayton, Louise M.,	Boston.
Hartwell, Harriet,	Boston.
Howland, Florence B.,	Revere.
Lockwood, D.,	Amherst.

Robie, H. W.,	Winona, N. H.
Williams, Mrs. Ada B.,	Nahant.
Wojcik, Rev. James,	Springfield, N. Y.
Wood, Lawrence,	Amherst.

Poultry Course.

Abbott, George H.,	Brookline.
Adams, Rev. W. H.,	Southampton.
Allis, Mrs. R. D.,	Amherst.
Allis, Rufus D.,	Amherst.
Barker, Arthur C.,	Boston.
Barnes, Mrs. Ralph,	Andover.
Bosworth, W. D.,	North Orange.
Brewer, Mrs. A. A.,	Southampton.
Brigham, Henry,	Northampton.
Brooks, A. A.,	Holyoke.
Brown, Geo. A.,	Amherst.
Browne, L. L.,	New York, N. Y.
Burnett, W. A.,	South Hadley.
Byam, Mrs. D. H.,	Mansfield.
Challis, H. E.,	South Hadley.
Childs, Emily F.,	Manomet.
Childs, P. B.,	Manomet.
Churchill, Mrs. Wm. W.,	Milton.
Clark, H. H.,	Billerica.
Clark, Norman,	Sunderland.
Corliss, Oscar L.,	Belchertown.
Cressey, George B.,	Salem.
Davis, Mrs. E. H.,	Amherst.
Doggett, Mary C.,	Dedham.
Doggett, T. T.,	Dedham.
Eldidge, Mrs. A.,	Amherst.
Estabrook, O. B.,	Hopedale.
Flagg, Helen L.,	West Acton.
Forristall, Mrs. E. H.,	Amherst.
Garabed, Mrs. D.,	Worcester.
Gold, M. D.,	Amherst.
Goodnow, J. S.,	Amherst.
Griswold, A. W.,	Elmwood, N. H.
Griswold, W. P.,	Holyoke.
Gunn, Chas. I.,	Sunderland.
Gunn, L. M.,	Sunderland.
Hack, Rev. Rollin T.,	Housatonic.
Harrison, Mrs. Walter H.,	Lebanon Springs, N. Y.
Harrison, Walter H.,	Lebanon Springs, N. Y.
Haven, Alta M.,	Mansfield.
Hawthorn, Peter,	Amherst.
Herrick, Ralph C.,	Hollis, N. H.
Hitchcock, Mary M.,	Ware.
Hodder, Mrs. A. R.,	Hadley.
Hooper, Mrs. W. H.,	East Milton.
Hyde, Elizabeth,	Ware.
Jacobs, D. I.,	Wellesley.
Jones, E. A.,	New Canaan, Conn.
Knowles, Rev. Samuel,	Lexington.
Lewis, I. C.,	Ulysses, Pa.
Lyon, Clarence W.,	South Weymouth.
Mayerison, T. Sydney,	Lawrence.
Messier, A. E.,	Amherst.
Miller, H. B.,	South Hadley.
Miskell, T. L.,	Brookline.
Moody, F. W.,	Rutland.
Morgan, Susie P.,	Amherst.

Morse, John E.,	Hadley.
Neil, James J.,	Lawrence.
Northan, H. H.,	Westfield.
Parsons, W. E.,	New Hartford, Conn.
Pease, Mrs. E. E.,	Granby.
Pease, E. E.,	Granby.
Perkins, Maude,	Newburyport.
Rice, W. A.,	South Hadley Falls.
Richardson, Harriet,	South Hadley.
Rood, Frank W.,	Southampton.
Shaw, Wm. E.,	Belchertown.
Smith, Louis E.,	Salem.
Stuart, H. W.,	Amherst.
Sturgis, Mrs. Edward,	Andover.
Talbot, H. S.,	South Hadley.
Thayer, Mrs. C. H.,	Amherst.
Thayer, H. A.,	Holyoke.
Speight, Thomas,	East Longmeadow.
Torrey, E. D.,	Easthampton.
Warner, Merrill,	Sunderland.
Warner, Robt. G.,	Florence.
White, Mrs. E. S.,	Roxbury.
Wolcott, Oliver,	East Longmeadow.

SUMMARY BY CLASSES.

Graduate students,	21
Senior class,	93
Junior class,	102
Sophomore class,	125
Freshman class,	184
Unclassified students,	31
Total registration,	556

GEOGRAPHICAL SUMMARY.

Massachusetts,	473
New York,	26
Connecticut,	20
New Jersey,	9
Pennsylvania,	5
New Hampshire,	4
Vermont,	4
Maine,	3
Rhode Island,	3
Barbados,	1
Colombia, S. A.,	1
Iowa,	1
Kentucky,	1
Maryland,	1
Mexico,	1
Ohio,	1
Virginia,	1
West Virginia,	1
Total,	556

GRADUATE STUDENTS — CANDIDATES FOR A DEGREE.

Ackerman, Arthur John, B.Sc., Massachusetts Agricultural College, 1912.	Worcester.
Anderson, David Wadsworth, B.Sc., New Hampshire State College, 1910.	Manchester, N. H.
Bourne, Arthur Isreal, A.B., Dartmouth College, 1907.	Kensington, N. H.
Davis, Irving Wilder, B.Sc., Massachusetts Agricultural College, 1911.	Lowell.
Fowler, George Scott, B.Sc., Massachusetts Agricultural College, 1912.	Wayland.
Gates, Rupert Granville, Ph.B., Sheffield Scientific School, 1912.	Northampton.
Gilbert, George Henry, Ph.B., Boston University, 1901.	Boylston.
Hall, Russell Bertram, B.Sc., Amherst College, 1912.	Worcester.
Hutson, John Coghlan, B.A., Oxford University, 1909.	Bridgetown, Barbados.
Martin, James Francis, B.Sc., Massachusetts Agricultural College, 1912.	Amherst.
Morse, Henry Bowditch, B.Sc., Massachusetts Agricultural College, 1911.	Salem.
Noyes, Harry Alfred, B.Sc., Massachusetts Agricultural College, 1912.	Marlborough.
Parker, Ralph Robinson, B.Sc., Massachusetts Agricultural College, 1912.	Malden.
Ruprecht, Rudolf William, B.Sc., Rhode Island State College, 1911.	Brooklyn, N. Y.
Richardson, Francis Allen, S.B., Harvard University, 1896.	Boston.
Smulyan, Marcus Thomas, B.Sc., Massachusetts Agricultural College, 1909.	Amherst.
Thomas, Frank Lincoln, B.Sc., Massachusetts Agricultural College, 1910.	Athol.
Tower, Daniel Gordon, B.Sc., Massachusetts Agricultural College, 1912.	Roxbury.
Turner, Howard Archibald, B.Sc., Massachusetts Agricultural College, 1912.	Dorchester.
Watkins, John Bedford, B.Sc., Virginia Polytechnic, 1911.	Midlouthian, Va.
Wehle, Harry Brandeis, A.B., Harvard University, 1910.	Louisville, Ky.

GRADUATE STUDENTS — NOT CANDIDATES FOR A DEGREE.

Eaton, Marion Goodwin, A.B., Radcliffe College, 1910.	Sudbury.
Rand, Frank Prentice, A.B., Williams College, 1912.	Worcester.

SUMMER SCHOOL REGISTRATION, 1911.

Aldrich, Helen,	Dorchester.
Allen, Mrs. Jas. A.,	Holyoke.
Allis, Mrs.,	Amherst.
Baker, Oliver A.,	Kingston.
Barry, Mary,	Amherst.
Bartlett, Mrs. Eugene,	Chicago, Ill.
Bartlett, Rev. Eugene,	Chicago, Ill.
Beaumont, Louise M.,	Worcester.
Belcher, S. Elizabeth,	Worcester.

Bennett, Alfred C.,	New York City.
Blanchard, Lucile M.,	North Uxbridge.
Bonsfield, Mary,	North Adams.
Boyd, Gardner,	Dedham.
Bradlee, Thomas,	Northampton.
Burke, E. G.,	Holyoke.
Burnham, Jessie E.,	Waltham.
Butcber, Gertrude,	Roxbury.
Carosella, Alfredo,	University of Pennsylvania, Philadelphia.
Car, Helen F.,	Boston.
Case, Myra W.,	West Hartford, Conn.
Chalmers, Helen,	New York.
Chalmers, Mary,	New York.
Cheney, Hazel Chase,	Amherst.
Chow, T. K.,	Amherst.
Church, Florence A.,	New York City.
Clark, Anna M.,	New York City.
Cleaveland, M. N.,	East Boxford.
Cole, Wm. Morton,	Newton Highlands.
Cölln, Miss M. Von,	Columbus, O.
Cushman, Mrs. F. P.,	Springfield.
Cushman, F. P.,	Springfield.
Dame, Daisy G.,	West Medford.
Dame, Mrs. Lorin L.,	West Medford.
Dibble, Mrs. Gertrude,	New York City.
Dimick, Julian A.,	East Corinth, Vt.
Doherty, Daniel F.,	Dorchester.
Eldidge, Mrs. Lizzie,	Amherst.
Epstein, Frances,	Amherst.
Epstein, Ida A.,	Amherst.
Evans, Augusta D.,	Northampton.
Farley, Chas. Judd,	Wellesley Hills.
Farnsworth, Earl H.,	Norwood.
Fisher, Georgina O.,	Cambridge.
Foley, Daniel,	Brighton.
Foster, Mr. C. W.,	Leominster.
Fox, Sarah E.,	Cohasset.
Gere, Robt. W.,	Springfield.
Gerould, Mrs. C. W.,	Cambridge.
Gerould, Chas. W.,	Cambridge.
Goodnow, Edna,	Amherst.
Gregory, E. S.,	Somerville.
Groff, J. G.,	Amherst.
Hall, E. Josephine,	Waltham.
Hea, Emily N.,	Medford.
Heidenheim, Hannah,	Brooklyn, N. Y.
Hewins, Alice E.,	Dedham.
Hidden, Mrs. W. H.,	Cambridge.
Hidden, W. H., Jr.,	Cambridge.
Holloway, Rev. Wm. H.,	Thomasville, Ga.
Howard, Mildred,	North Amherst.
Hoyt, Mrs. Laura A.,	Greenfield.
Hurd, Mrs. Wm.,	Amherst.
Johnson, Bertha L.,	Bristol, Conn.
Kellogg, Ella,	North Amherst.
Kennedy, H. A.,	East Weymouth.
Levin, Ethel,	Amherst.
Liang, F. T.,	Amherst.
Liang, Yii Cho,	Amherst.
Lew, Gerard N.,	Amherst.
Lovell, Mary E.,	Wayland.
Lyman, Harriet E.,	Boston.
Macdonald, Chas. D.,	New York City.

McKeen, Mrs. Teresa F.,	Allston.
Macomber, Lucy S.,	North Westport.
Maloney, Margaret,	Amherst.
Manoukian, V. M.,	Boston.
March, Mrs. Clement,	Arlington.
Matthews, Enid,	Cambridge.
Mills, Mabelle,	Amherst.
Mumma, C. H.,	Holyoke.
Nickerson, Charlotte,	Amherst.
Ostrolenk, Theresa,	Amherst.
Pabodie, Mrs.,	Hartwell, O.
Pabodie, Wm.,	Hartwell, O.
Perry, Sylvia,	Amherst.
Peters, Thomas H.,	North Truro.
Petersen, Anna K.,	Everett.
Petersen, Ella O.,	Everett.
Petersen, Lilian O.,	Everett.
Phelps, Annie L.,	Boston.
Potter, Sara E.,	Roxbury.
Putnam, Chas. S.,	Walpole, N. H.
Quint, Harry,	Roxbury.
Richards, J. L.,	Brookline.
Roberts, Fanny E.,	Brooklyn, N. Y.
Roberts, Jessie,	Kingston, N. Y.
Robinson, Mrs. A. M.,	South Boston.
Robinson, Dr. M. B. (Miss),	Waltham.
Roys, Mabelle F. (Mrs.),	Boxford.
Roys, Rev. Edville A.,	Boxford.
Seaverns, Annie W.,	Jamaica Plain.
Shaw, Rev. Arthur W.,	Goffstown, N. H.
Sherman, Frank M., Jr.,	West Newton.
Sherman, Sara L.,	Weston.
Sherrard, Evelyn B.,	West Waltham.
Shumway, Ruth,	Amherst.
Simmons, Alva N.,	Roslindale.
Sloane, Laura,	Amherst.
Smith, John F.,	Berea, Ky.
Souther, Marguerite,	Jamaica Plain.
Strickland, Elinor,	Amherst.
Stutson, Miss P. B.,	Columbus, O.
Sun, Y. Philander,	Worcester.
Sussman, Rudolf,	Sharon.
Story, Mrs. G. E.,	Amherst.
Tobin, Ellen C.,	Lawrence.
Tucker, Arabella H.,	Worcester.
Vining, Roscoe H.,	Ipswich.
White, Mrs. Ellen S.,	Grove Hall.
Whitman, Adelaide,	Amherst.
Whitney, Jos. T.,	Medford.
Williams, Guy F.,	North Anson, Me.
Wiswell, Ralph A.,	Newton Center.

INDEX.

PAGE
Admission 23
Advanced standing 35
Agricultural education 76
Agricultural Economics. (See Economics.)
Agriculture 45
Agronomy 45
Alumni associations, class secretaries, etc. 122
Animal husbandry 46
Attendance, summary of 154
Awards. (See Honors.)

Bacteriology. (See Veterinary Science and Microbiology.)
Botany 55, 88

Certificates. (See Admission.)
Chemistry 57, 88
Civil engineering. (See Mathematics.)
Clubs, etc. (See Organizations.)
College officers. (See Faculty.)
Committees of faculty 18
Corporation 10
Courses of instruction:
  Undergraduate 37–82
  Graduate 85–90

Dairying 47
Degrees conferred 124
Drawing 54

Economics 67, 75
English 69
Entomology 61, 89
Entrance. (See Admission.)
Equipment of departments 113
Examinations, entrance. (See Admission.)
Expenses 107
Experiment station 9, 15
Extension work 15, 91

Faculty and faculty committees 12, 18
Farm administration 48
Fees 108
Floriculture 50
Forestry 51
French 73

General departments 80
General information 104
Geology. (See Zoölogy.)
German 72
Government. (See History.)
Graduate school 83

PAGE
History 68
Honors 121
Horticulture 50, 90
Humanities 67
Hygiene 82

Journalism 70

Landscape gardening 52
Languages, modern European. (See English, French, German, Spanish.)
Library 118
Literature. (See English, French, German, Spanish, Rural Social Science.)

Majors 39
Market gardening 53
Massachusetts Agricultural College 7
Massachusetts Agricultural Experiment Station 9
Mathematics 63
Microbiology 64
Military science 80
Music 74

Organizations, student 111

Physical education 82
Physics 64
Political science. (See History.)
Pomology 53
Poultry husbandry 48
Prizes 112
Public speaking 71

Roll of students 129
Rural social science 75
Rural sociology 77

Science, division of 55
Short courses. (See Extension Work.)
Sociology. (See Economics, Rural Social Science.)
Spanish 74
Student expenses 104–111
Students, roll of 129
Summer school. (See Extension Work.)

Trustees, etc. 10

Undergraduate courses 37–82

Veterinary science 65

Winter school. (See Extension Work.)

Zoölogy 66, 90

UNIVERSITY OF ILLINOIS-URBANA
3 0112 112208043